US011368192B2

(12) **United States Patent**
Hong

(10) **Patent No.: US 11,368,192 B2**
(45) **Date of Patent: *Jun. 21, 2022**

(54) **ELECTRONIC DEVICE AND METHOD FOR SHORT RANGE WIRELESS COMMUNICATION IN THE ELECTRONIC DEVICE**

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(73) Assignee: **Samsung Electronics Co., Ltd.**, Suwon-si (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **17/249,355**

(22) Filed: **Feb. 26, 2021**

(65) **Prior Publication Data**

US 2021/0184730 A1 Jun. 17, 2021

Related U.S. Application Data

(63) Continuation of application No. 16/716,190, filed on Dec. 16, 2019, now Pat. No. 10,944,446, which is a (Continued)

(30) **Foreign Application Priority Data**

Jan. 21, 2016 (KR) 10-2016-0007716

(51) **Int. Cl.**
H04B 5/00 (2006.01)
H04M 1/72412 (2021.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04B 5/0075*** (2013.01); ***H04B 1/3888*** (2013.01); ***H04B 5/0031*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC H04B 5/00
See application file for complete search history.

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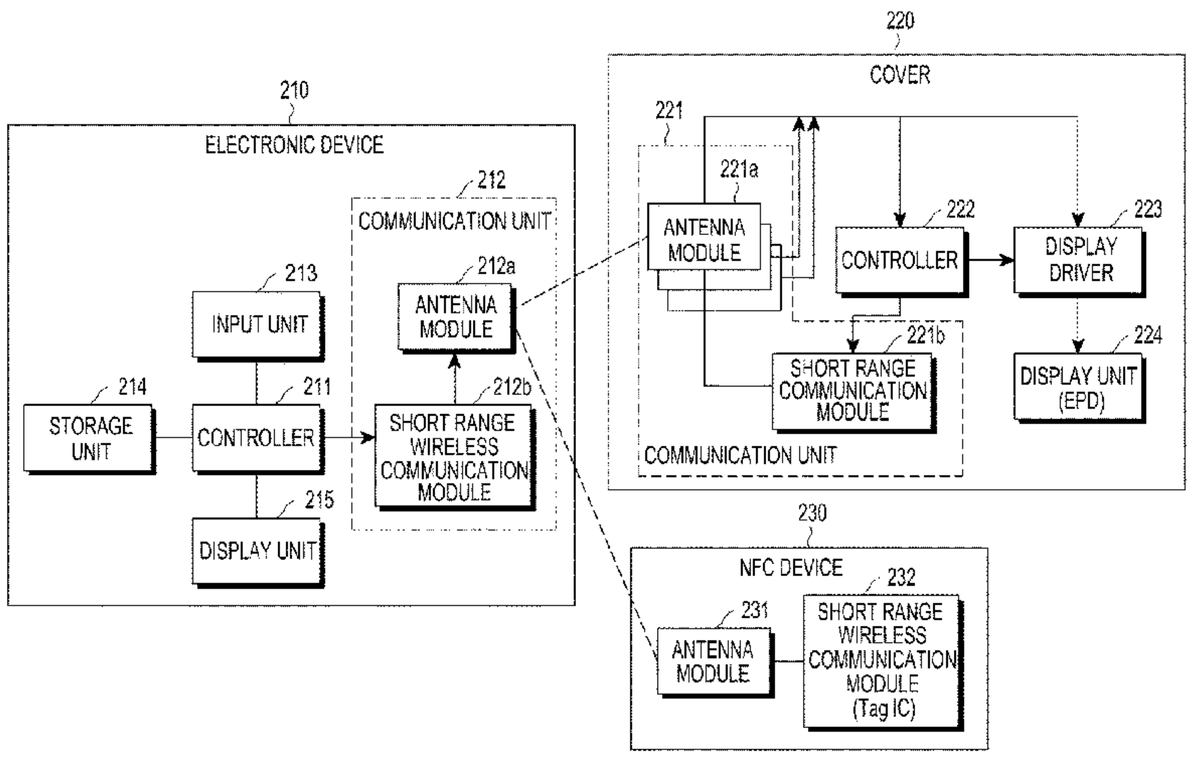
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Primary Examiner — Cindy Trandai

(57) **ABSTRACT**

Disclosed are an electronic device and a method of short range wireless communication in an electronic device. The method of operating the electronic device may include: when a cover is connected to the electronic device through a short range wireless communication connection, determining generation of an event related to the cover. The method further comprises, when the event is generated, supplying power to the cover through wireless communication, when the cover is driven by the supplied power, transmitting event information to the cover through the short range wireless communication connection to display the information related to the generated event on the cover, and, when an operation of the cover according to the event is completed, switching to a standby mode after releasing the short range wireless communication connection with the cover.

18 Claims, 20 Drawing Sheets



Related U.S. Application Data

continuation of application No. 16/036,429, filed on Jul. 16, 2018, now Pat. No. 10,511,348, which is a continuation of application No. 15/411,908, filed on Jan. 20, 2017, now Pat. No. 10,027,380.

(51) **Int. Cl.**
H04B 1/3888 (2015.01)
H04W 12/06 (2021.01)

(52) **U.S. Cl.**
CPC ***H04B 5/0037*** (2013.01); ***H04M 1/72412*** (2021.01); ***H04W 12/06*** (2013.01)

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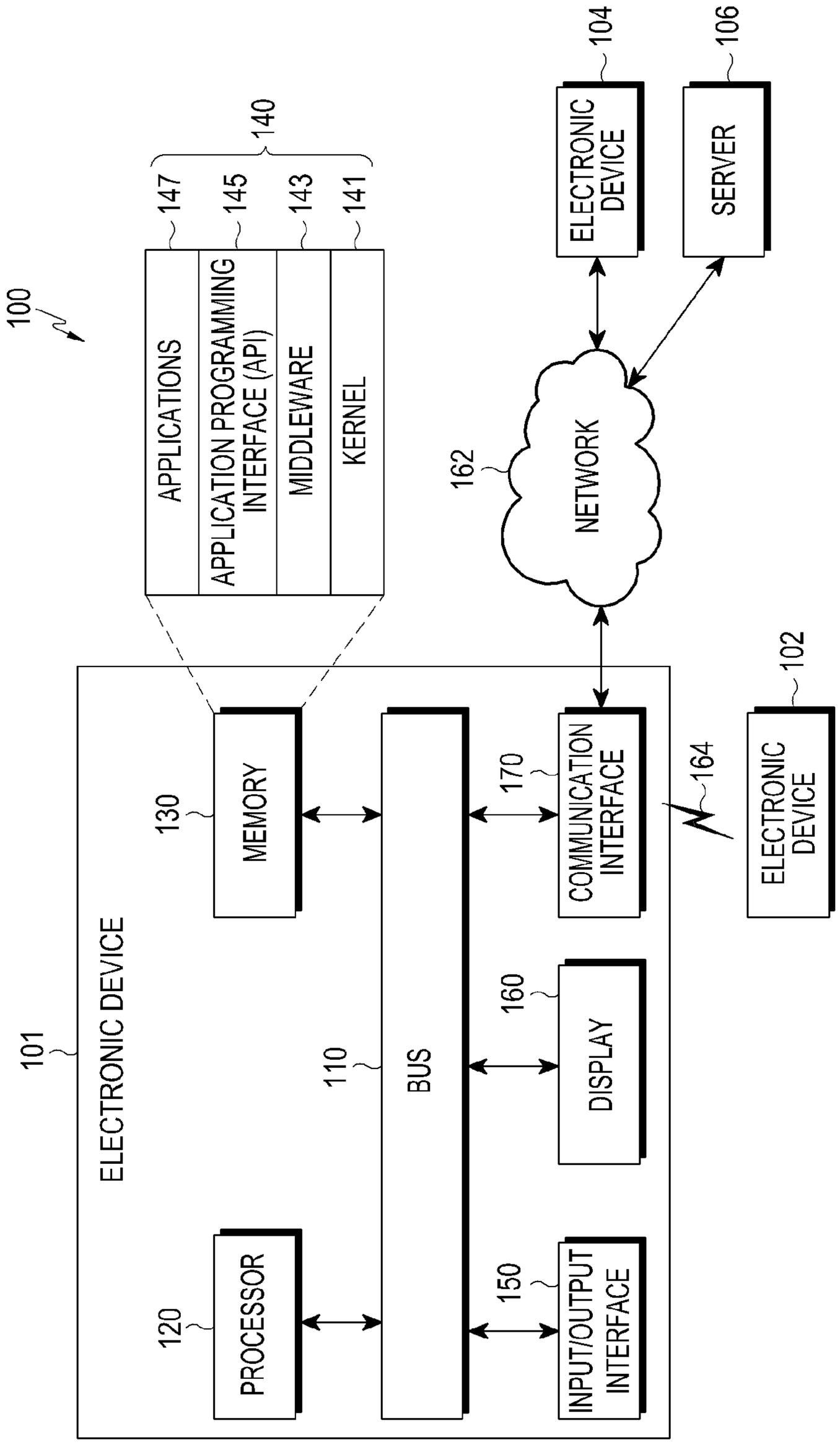

100
140
147
145
143
141
APPLICATIONS
APPLICATION PROGRAMMING INTERFACE (API)
MIDDLEWARE
KERNEL
104
106
ELECTRONIC DEVICE
SERVER
162
NETWORK
130
MEMORY
170
COMMUNICATION INTERFACE
164
102
ELECTRONIC DEVICE
101
ELECTRONIC DEVICE
120
PROCESSOR
110
BUS
150
INPUT/OUTPUT INTERFACE
160
DISPLAY

FIG. 1

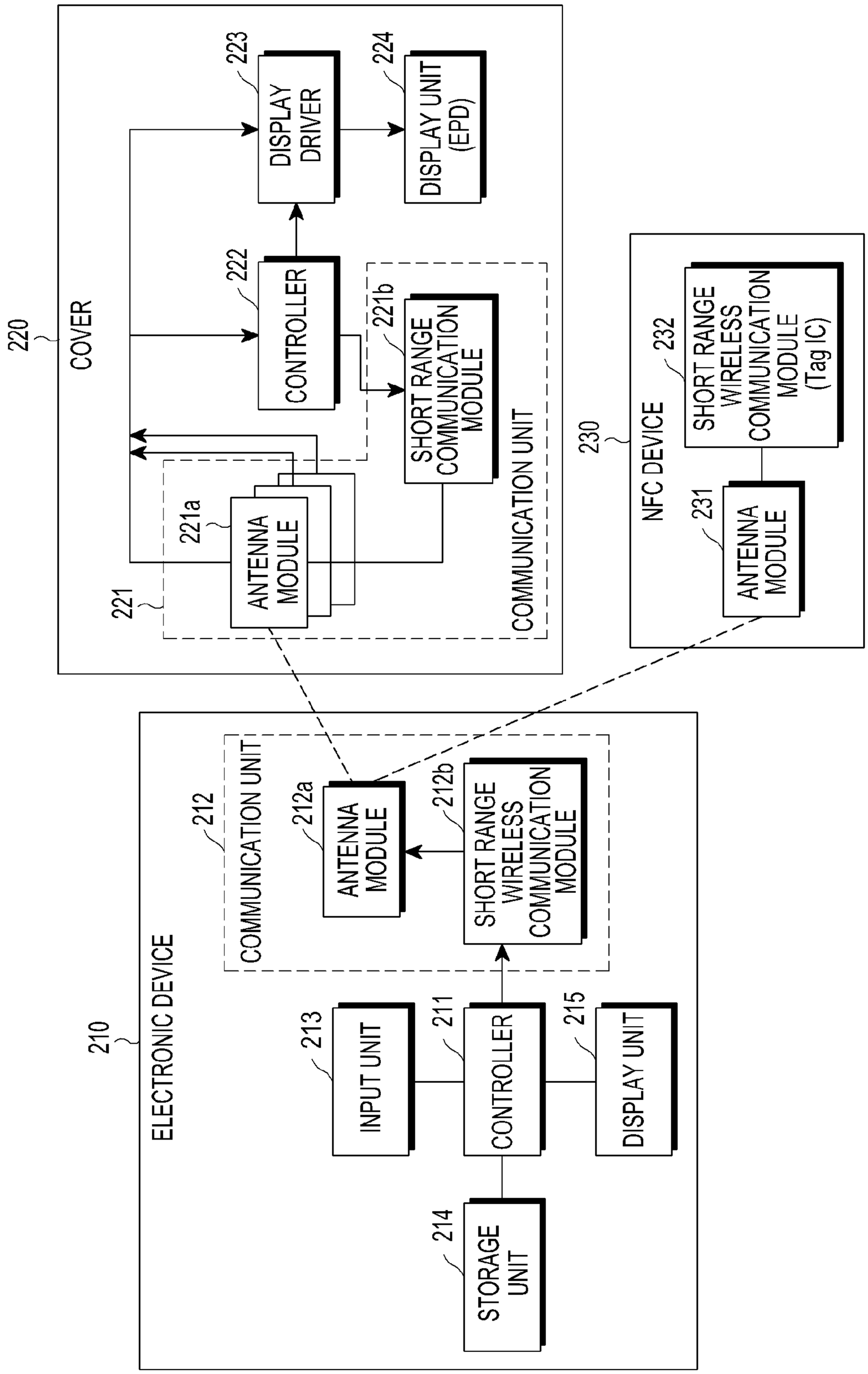

ELECTRONIC DEVICE
210
COMMUNICATION UNIT
212
ANTENNA MODULE
212a
SHORT RANGE WIRELESS COMMUNICATION MODULE
212b
INPUT UNIT
213
CONTROLLER
211
DISPLAY UNIT
215
STORAGE UNIT
214
COVER
220
COMMUNICATION UNIT
221
ANTENNA MODULE
221a
SHORT RANGE COMMUNICATION MODULE
221b
CONTROLLER
222
DISPLAY DRIVER
223
DISPLAY UNIT (EPD)
224
NFC DEVICE
230
ANTENNA MODULE
231
SHORT RANGE WIRELESS COMMUNICATION MODULE (Tag IC)
232

FIG.2

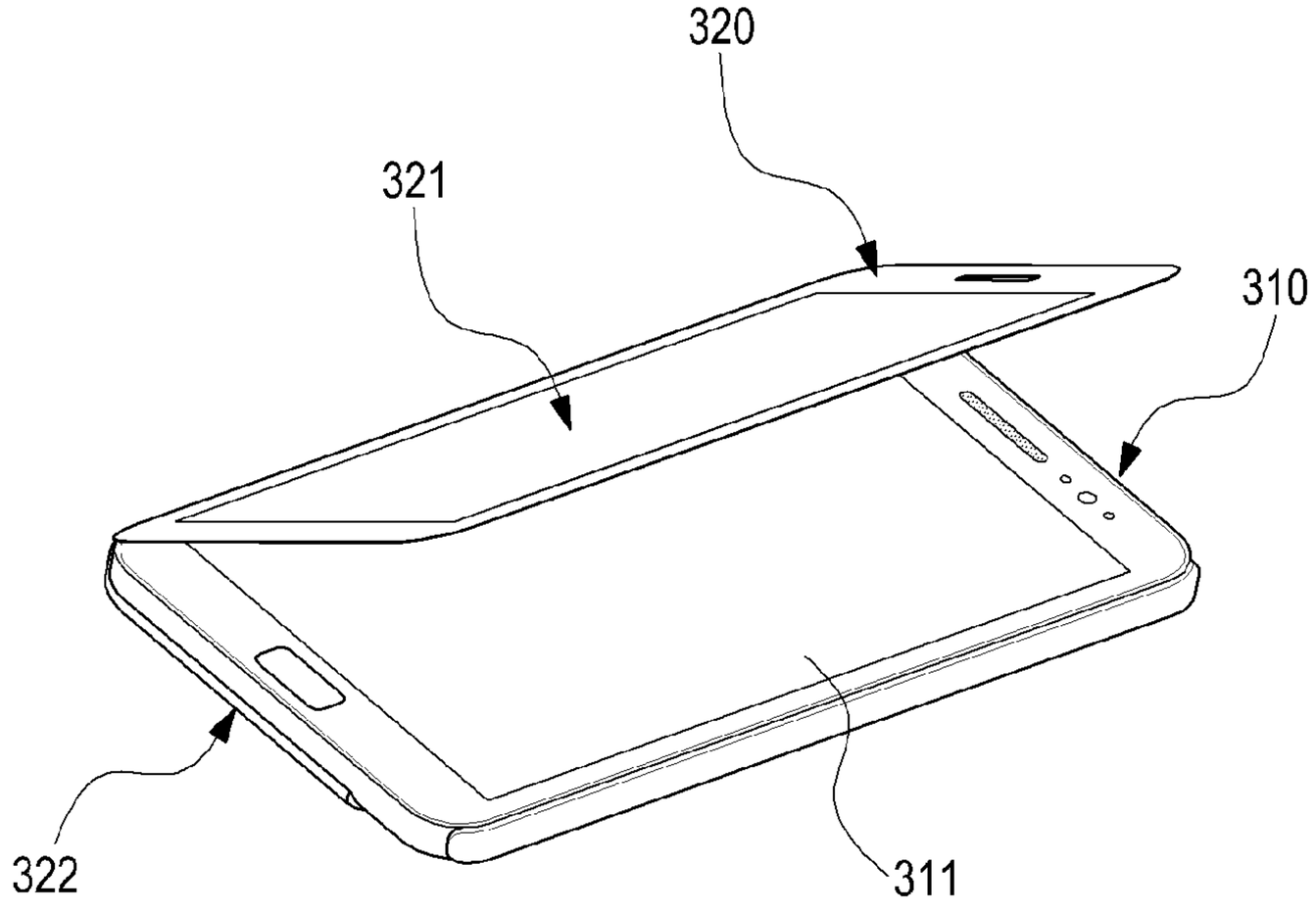


FIG.3

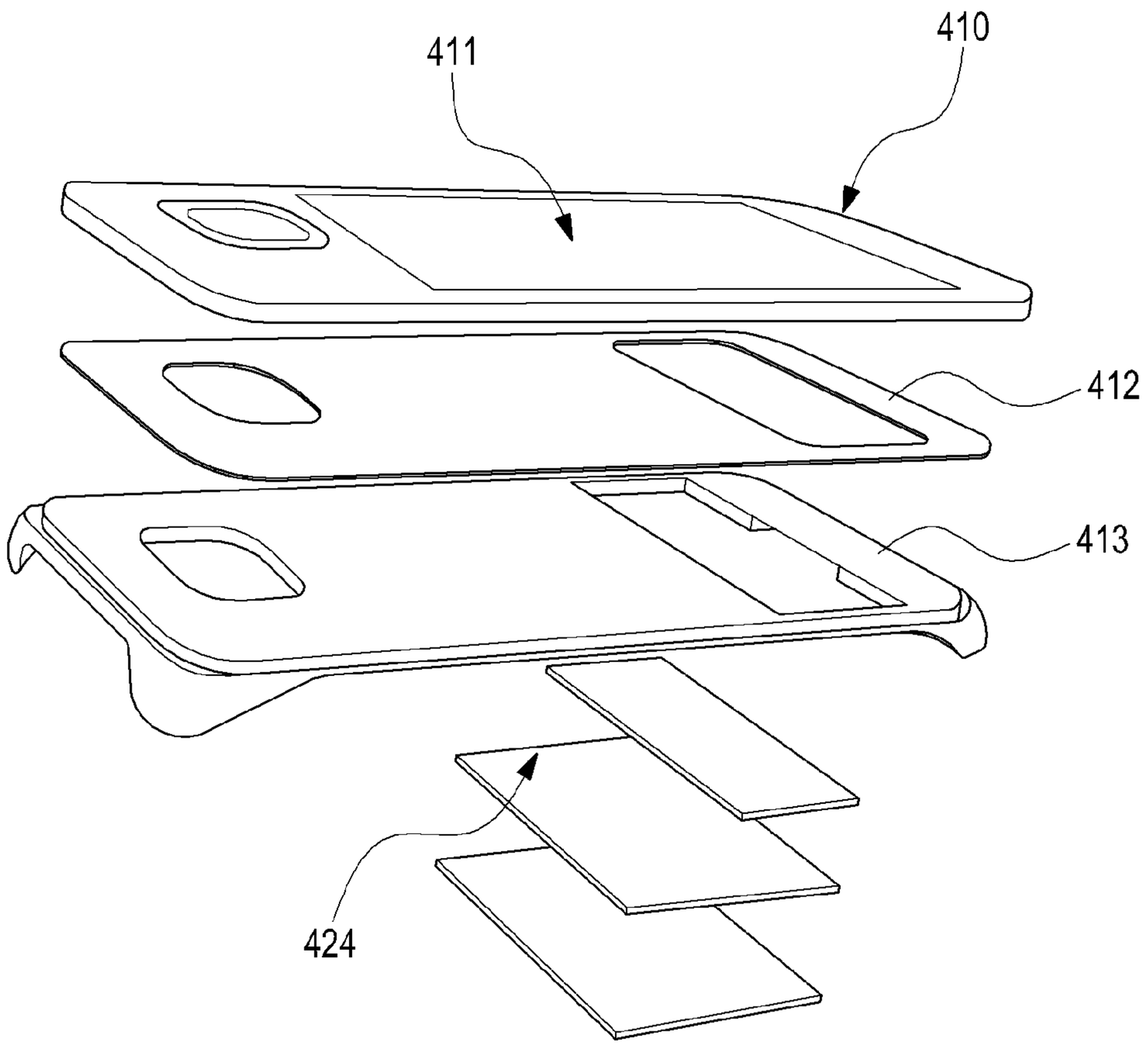


FIG.4

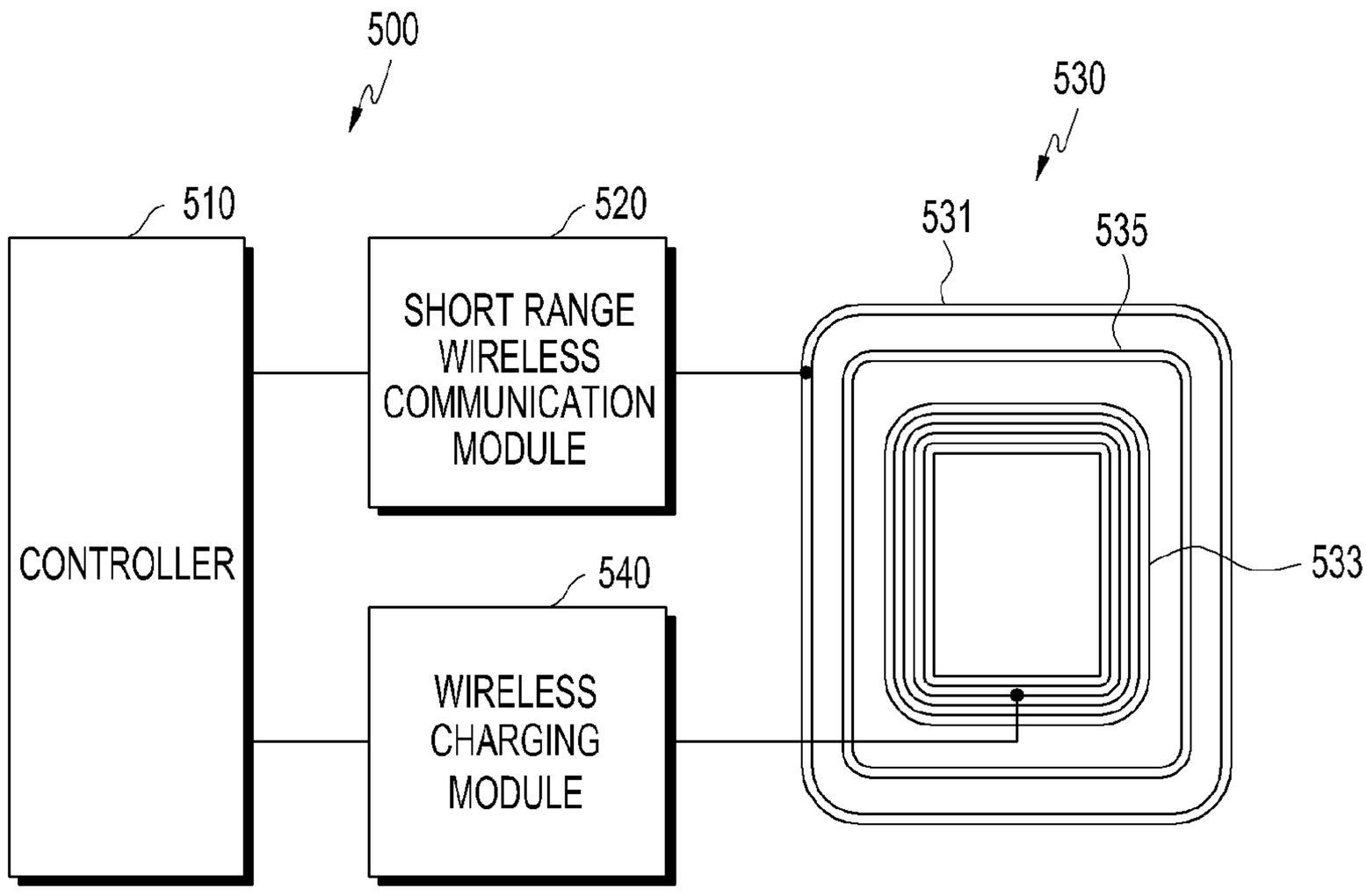

500
530
510
520
531
535
SHORT RANGE WIRELESS COMMUNICATION MODULE
CONTROLLER
533
540
WIRELESS CHARGING MODULE

FIG.5

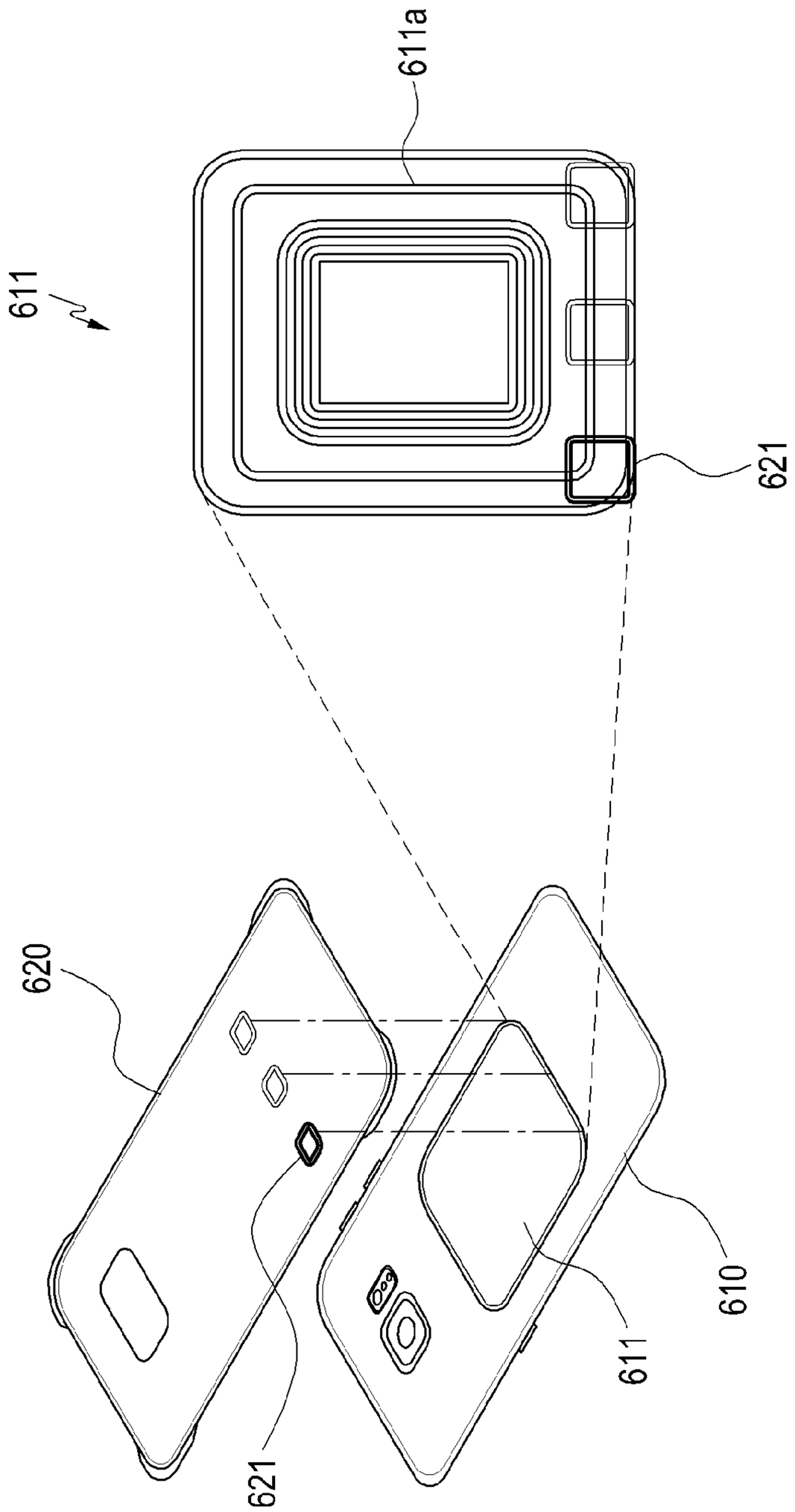


FIG.6

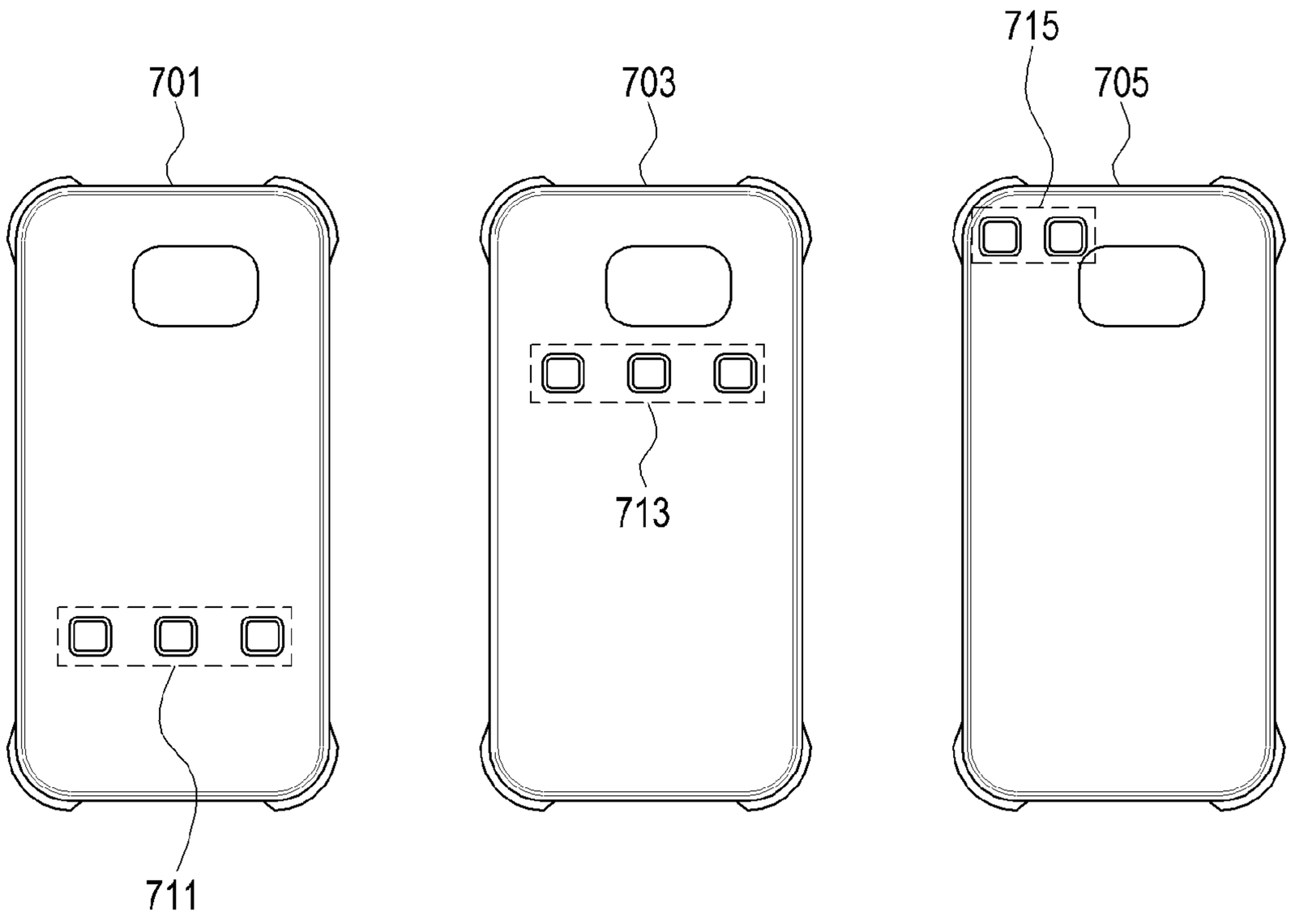


FIG.7

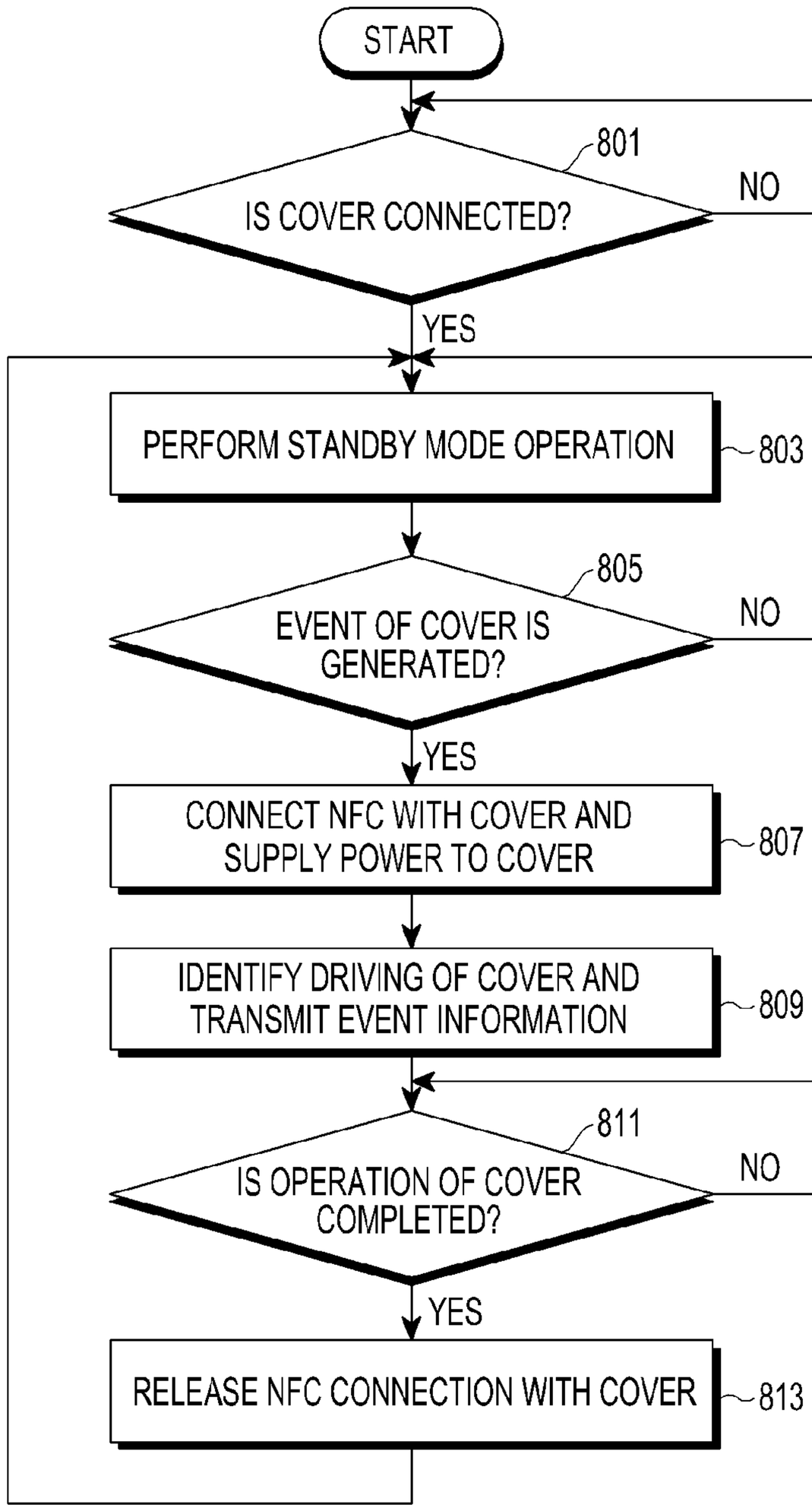

START
801
IS COVER CONNECTED?
NO
YES
PERFORM STANDBY MODE OPERATION
803
805
EVENT OF COVER IS GENERATED?
NO
YES
CONNECT NFC WITH COVER AND SUPPLY POWER TO COVER
807
IDENTIFY DRIVING OF COVER AND TRANSMIT EVENT INFORMATION
809
811
IS OPERATION OF COVER COMPLETED?
NO
YES
RELEASE NFC CONNECTION WITH COVER
813

FIG.8

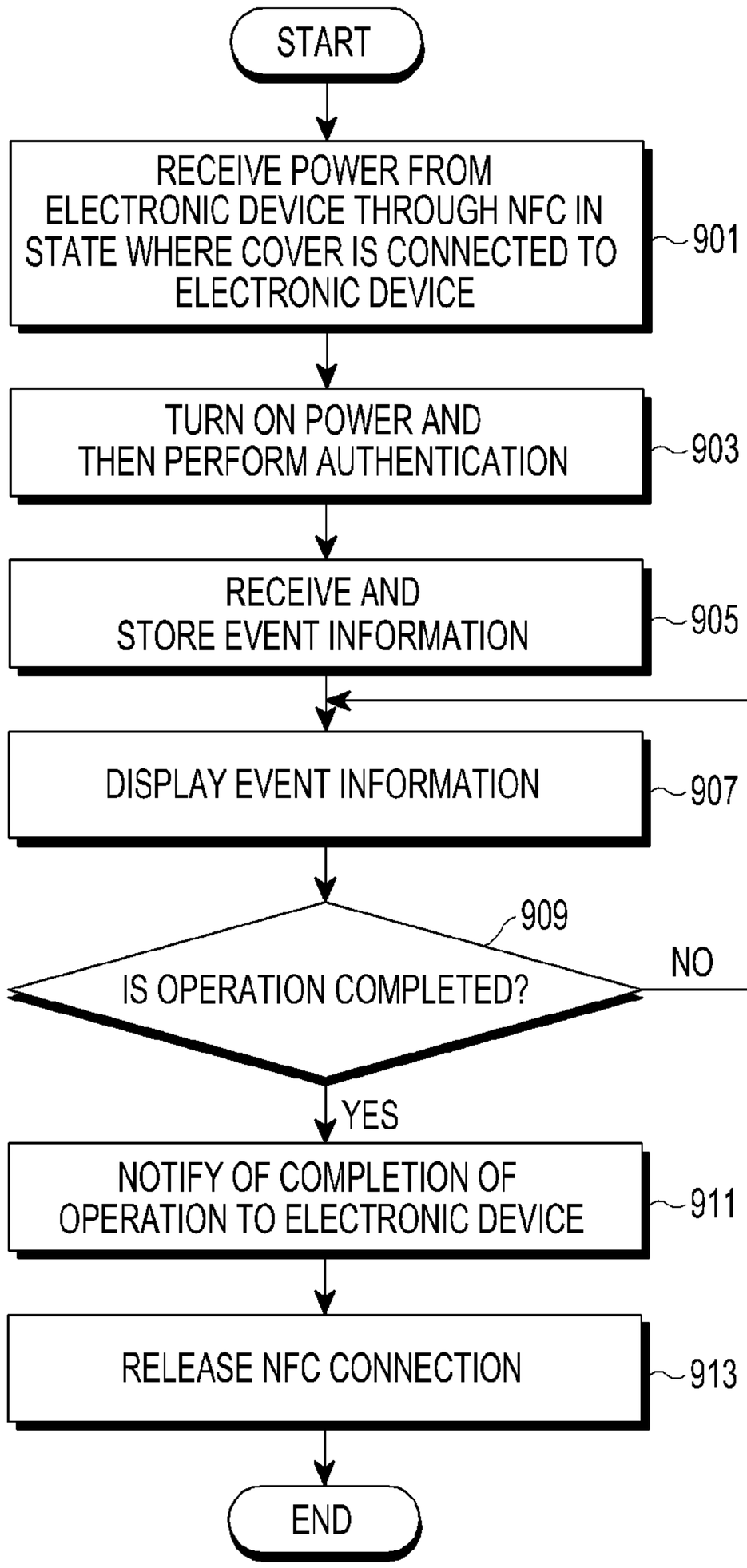

START
RECEIVE POWER FROM ELECTRONIC DEVICE THROUGH NFC IN STATE WHERE COVER IS CONNECTED TO ELECTRONIC DEVICE
901
TURN ON POWER AND THEN PERFORM AUTHENTICATION
903
RECEIVE AND STORE EVENT INFORMATION
905
DISPLAY EVENT INFORMATION
907
IS OPERATION COMPLETED?
909
NO
YES
NOTIFY OF COMPLETION OF OPERATION TO ELECTRONIC DEVICE
911
RELEASE NFC CONNECTION
913
END

FIG.9

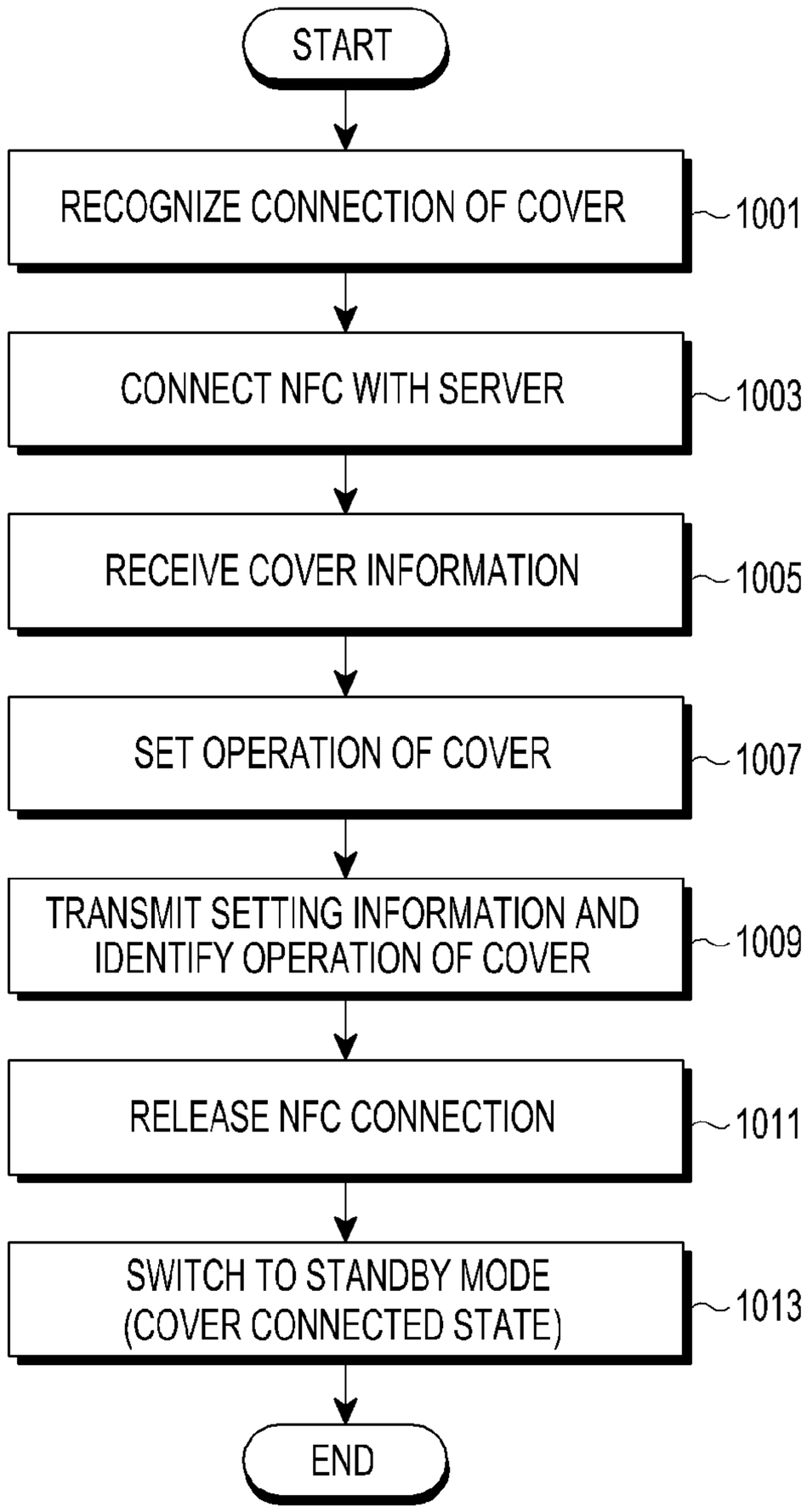

START
RECOGNIZE CONNECTION OF COVER
1001
CONNECT NFC WITH SERVER
1003
RECEIVE COVER INFORMATION
1005
SET OPERATION OF COVER
1007
TRANSMIT SETTING INFORMATION AND IDENTIFY OPERATION OF COVER
1009
RELEASE NFC CONNECTION
1011
SWITCH TO STANDBY MODE (COVER CONNECTED STATE)
1013
END

FIG.10

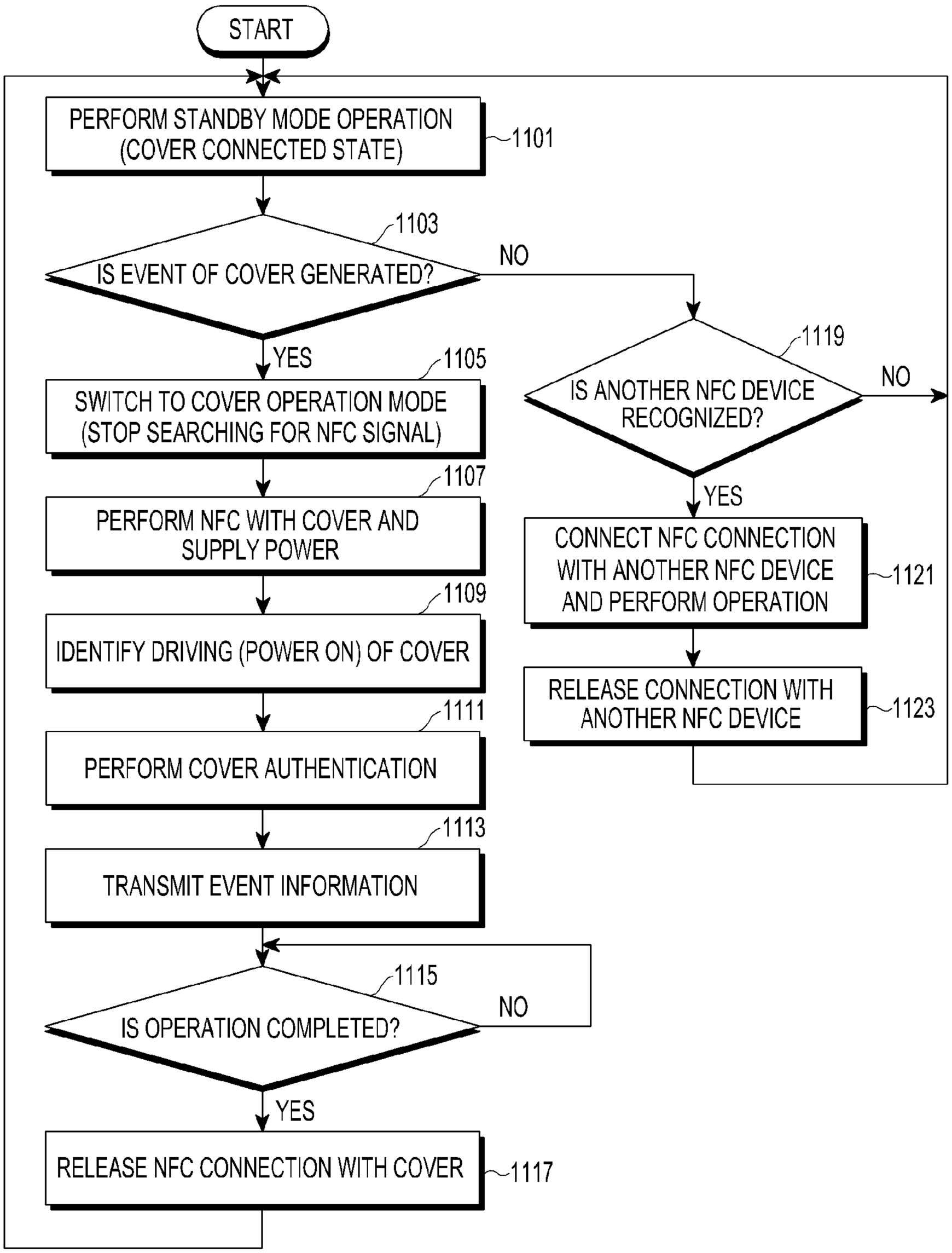

START
PERFORM STANDBY MODE OPERATION (COVER CONNECTED STATE)
1101
1103
IS EVENT OF COVER GENERATED?
NO
YES
1105
SWITCH TO COVER OPERATION MODE (STOP SEARCHING FOR NFC SIGNAL)
1107
PERFORM NFC WITH COVER AND SUPPLY POWER
1109
IDENTIFY DRIVING (POWER ON) OF COVER
1111
PERFORM COVER AUTHENTICATION
1113
TRANSMIT EVENT INFORMATION
1115
IS OPERATION COMPLETED?
NO
YES
RELEASE NFC CONNECTION WITH COVER
1117
1119
IS ANOTHER NFC DEVICE RECOGNIZED?
NO
YES
CONNECT NFC CONNECTION WITH ANOTHER NFC DEVICE AND PERFORM OPERATION
1121
RELEASE CONNECTION WITH ANOTHER NFC DEVICE
1123

FIG.11

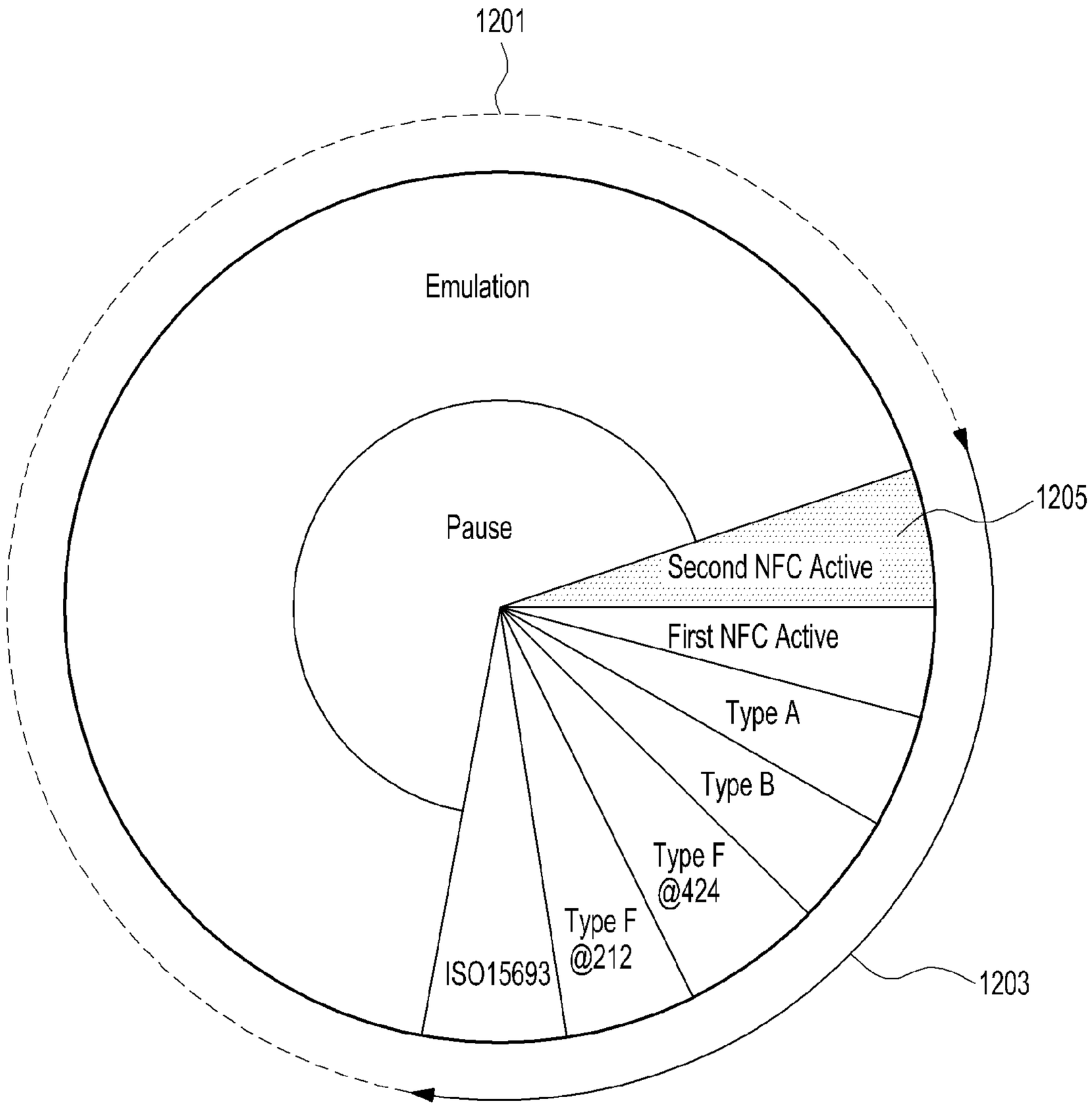

1201
Emulation
Pause
Second NFC Active
First NFC Active
Type A
Type B
Type F
@424
Type F
@212
ISO15693
1205
1203

FIG.12

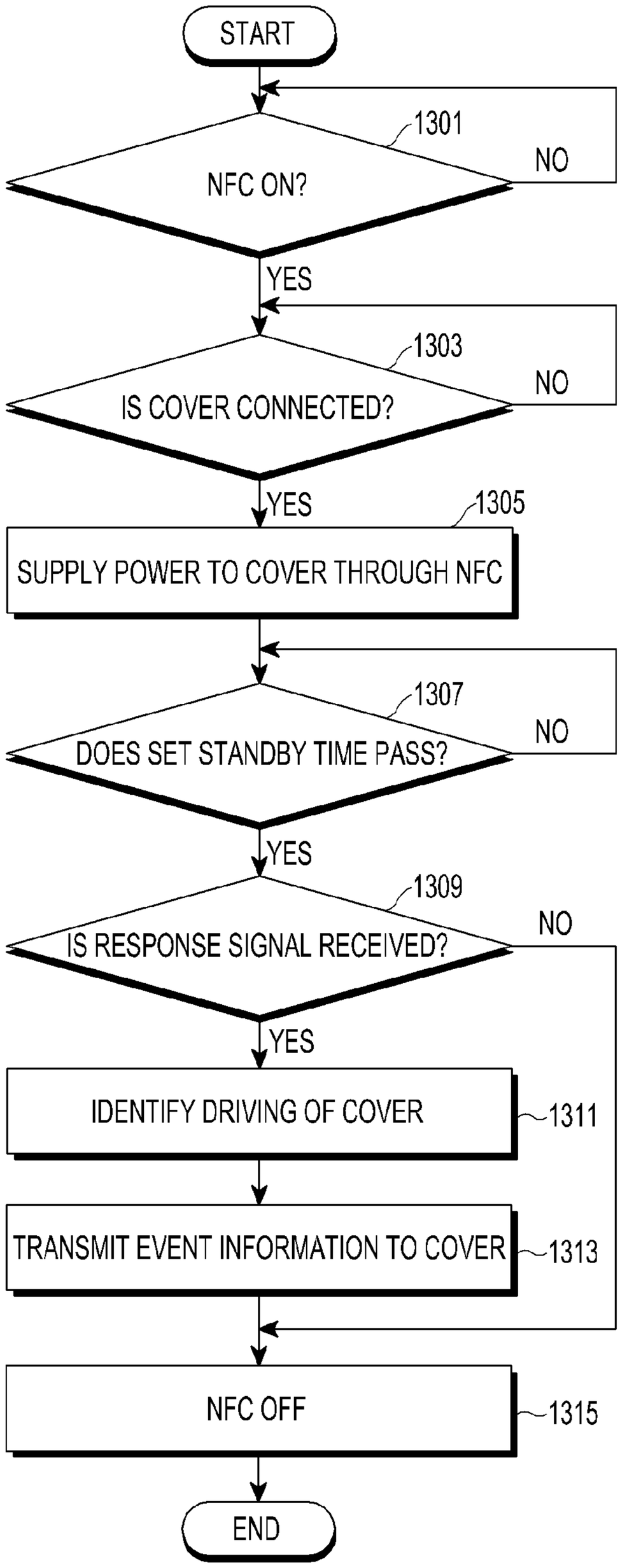

START
1301
NFC ON?
NO
YES
1303
IS COVER CONNECTED?
NO
YES
1305
SUPPLY POWER TO COVER THROUGH NFC
1307
DOES SET STANDBY TIME PASS?
NO
YES
1309
IS RESPONSE SIGNAL RECEIVED?
NO
YES
IDENTIFY DRIVING OF COVER
1311
TRANSMIT EVENT INFORMATION TO COVER
1313
NFC OFF
1315
END

FIG.13

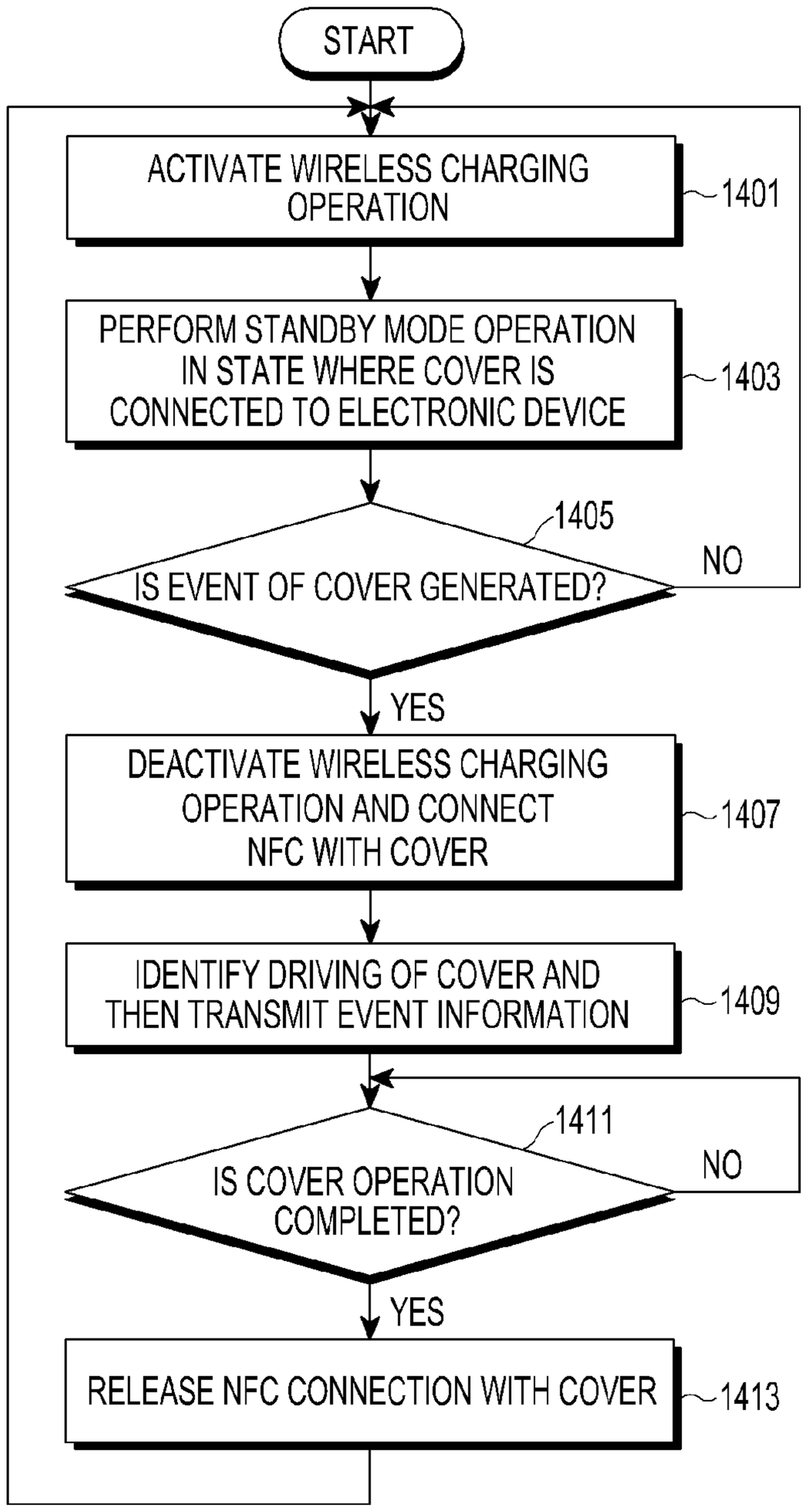

START
ACTIVATE WIRELESS CHARGING OPERATION
1401
PERFORM STANDBY MODE OPERATION IN STATE WHERE COVER IS CONNECTED TO ELECTRONIC DEVICE
1403
1405
IS EVENT OF COVER GENERATED?
NO
YES
DEACTIVATE WIRELESS CHARGING OPERATION AND CONNECT NFC WITH COVER
1407
IDENTIFY DRIVING OF COVER AND THEN TRANSMIT EVENT INFORMATION
1409
1411
IS COVER OPERATION COMPLETED?
NO
YES
RELEASE NFC CONNECTION WITH COVER
1413

FIG.14

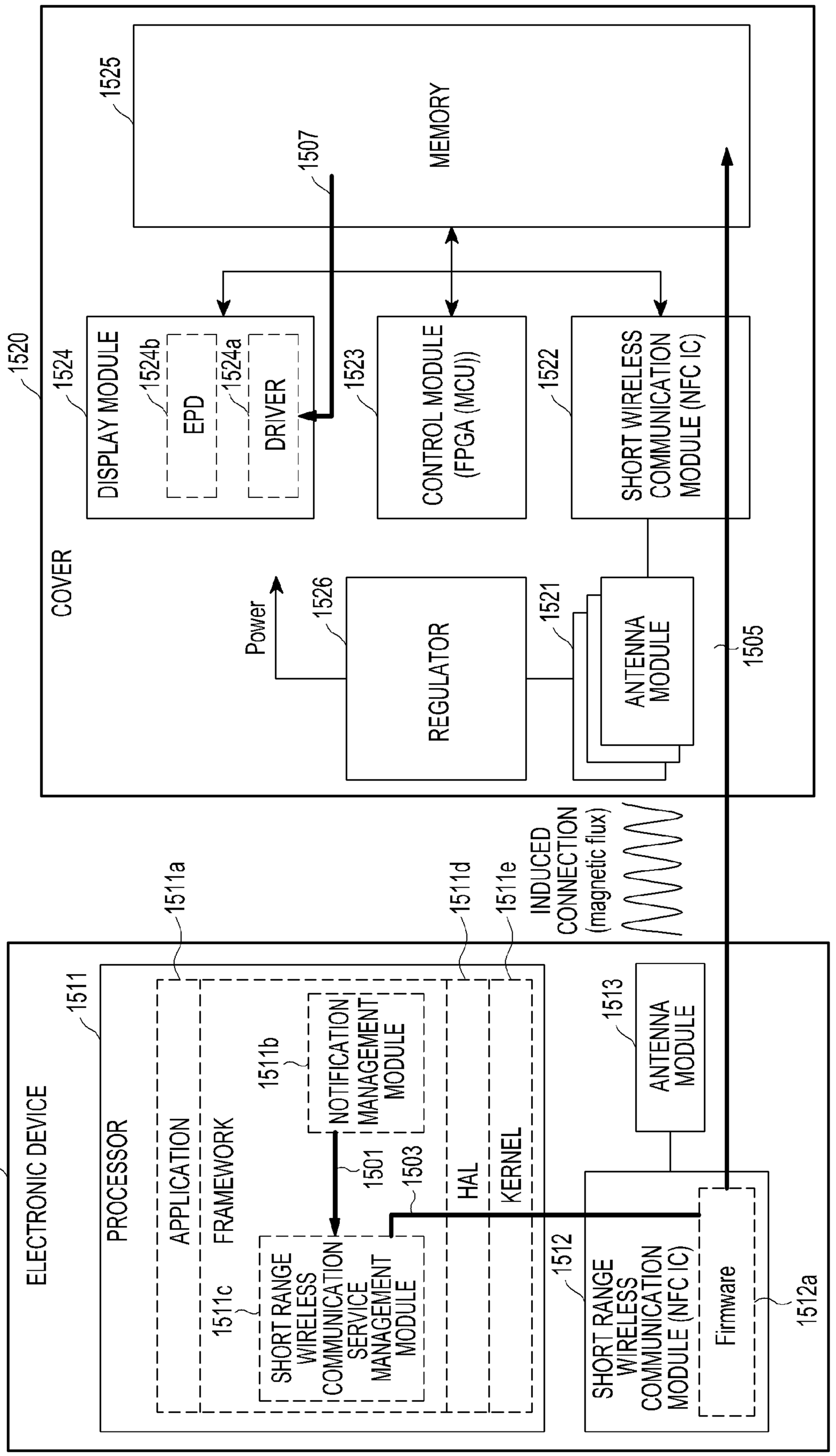

ELECTRONIC DEVICE
1510
PROCESSOR
1511
APPLICATION
FRAMEWORK
1511c
SHORT RANGE WIRELESS COMMUNICATION SERVICE MANAGEMENT MODULE
1511b
NOTIFICATION MANAGEMENT MODULE
1501
1503
HAL
KERNEL
1512
SHORT RANGE WIRELESS COMMUNICATION MODULE (NFC IC)
Firmware
1512a
1513
ANTENNA MODULE
1511a
1511d
1511e
INDUCED CONNECTION (magnetic flux)
1520
COVER
1524
DISPLAY MODULE
1524b
EPD
1524a
DRIVER
1523
CONTROL MODULE (FPGA (MCU))
1522
SHORT WIRELESS COMMUNICATION MODULE (NFC IC)
Power
1526
REGULATOR
1521
ANTENNA MODULE
1505
1525
MEMORY
1507

FIG.15

1601

Comment	ADDR	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Command_Host	0001	Write_done		Repeat		numOfFr	numOfFr	numOfFr	numOfFr
Status_FPGA	0002					TimeOfFr	TimeOfFr	TimeOfFr	TimeOfFr
	0003								
Updated date	0004	Year	Year	Year	Year	Month	Month	Month	Month
Updated date	0005	Date	Date	Date	Date	Date	Date		
Updated time	0006	AM/PM	Hr	Hr	Hr	Hr	Hr		
Updated minute	0007	Min	Min	Min	Min	Min	Min		
	0008								
Frame squence	0009	1st Frame	1st Frame	1st Frame		2nd Fr	2nd Fr	2nd Fr	2nd Fr
Frame squence	0010	3nd Fr	3nd Fr	3nd Fr		4nd Fr	4nd Fr	4nd Fr	4nd Fr
Frame squence	0011	5th Fr	5th Fr	5th Fr		6th Fr	6th Fr	6th Fr	6th Fr
Frame squence	0012	7th Fr	7th Fr	7th Fr		8th Fr	8th Fr	8th Fr	8th Fr
Frame squence	0013	9th Fr	9th Fr	9th Fr		10th Fr	10th Fr	10th Fr	10th Fr
	0014								
	0015								
	0016								
Frame1, Row1	0017	[1,1]	[1,2]	[1,3]	[1,4]	[1,5]	[1,6]	[1,7]	[1,8]
Frame1, Row2	0018	[2,1]	[2,2]	[2,3]	[2,4]	[2,5]	[2,6]	[2,7]	[2,8]
Frame1, Row3	0019	[3,1]	[3,2]	[3,3]	[3,4]	[3,5]	[3,6]	[3,7]	[3,8]
Frame1, Row4	0020	[4,1]	[4,2]	[4,3]	[4,4]	[4,5]	[4,6]	[4,7]	[4,8]
Frame1, Row5	0021	[5,1]	[5,2]	[5,3]	[5,4]	[5,5]	[5,6]	[5,7]	[5,8]
Frame1, Row6	0022	[6,1]	[6,2]	[6,3]	[6,4]	[6,5]	[6,6]	[6,7]	[6,8]
Frame1, Row7	0023	[7,1]	[7,2]	[7,3]	[7,4]	[7,5]	[7,6]	[7,7]	[7,8]
Frame1, Row8	0024	[8,1]	[8,2]	[8,3]	[8,4]	[8,5]	[8,6]	[8,7]	[8,8]
Empty	0014	0	0	0	0	0	0	0	0
Empty	0015	0	0	0	0	0	0	0	0
Empty	0016	0	0	0	0	0	0	0	0
Empty	0081	0	0	0	0	0	0	0	0
Empty	0082	0	0	0	0	0	0	0	0
Empty	0083	0	0	0	0	0	0	0	0
Empty	0084	0	0	0	0	0	0	0	0
Empty	0085	0	0	0	0	0	0	0	0

1603

FIG.16

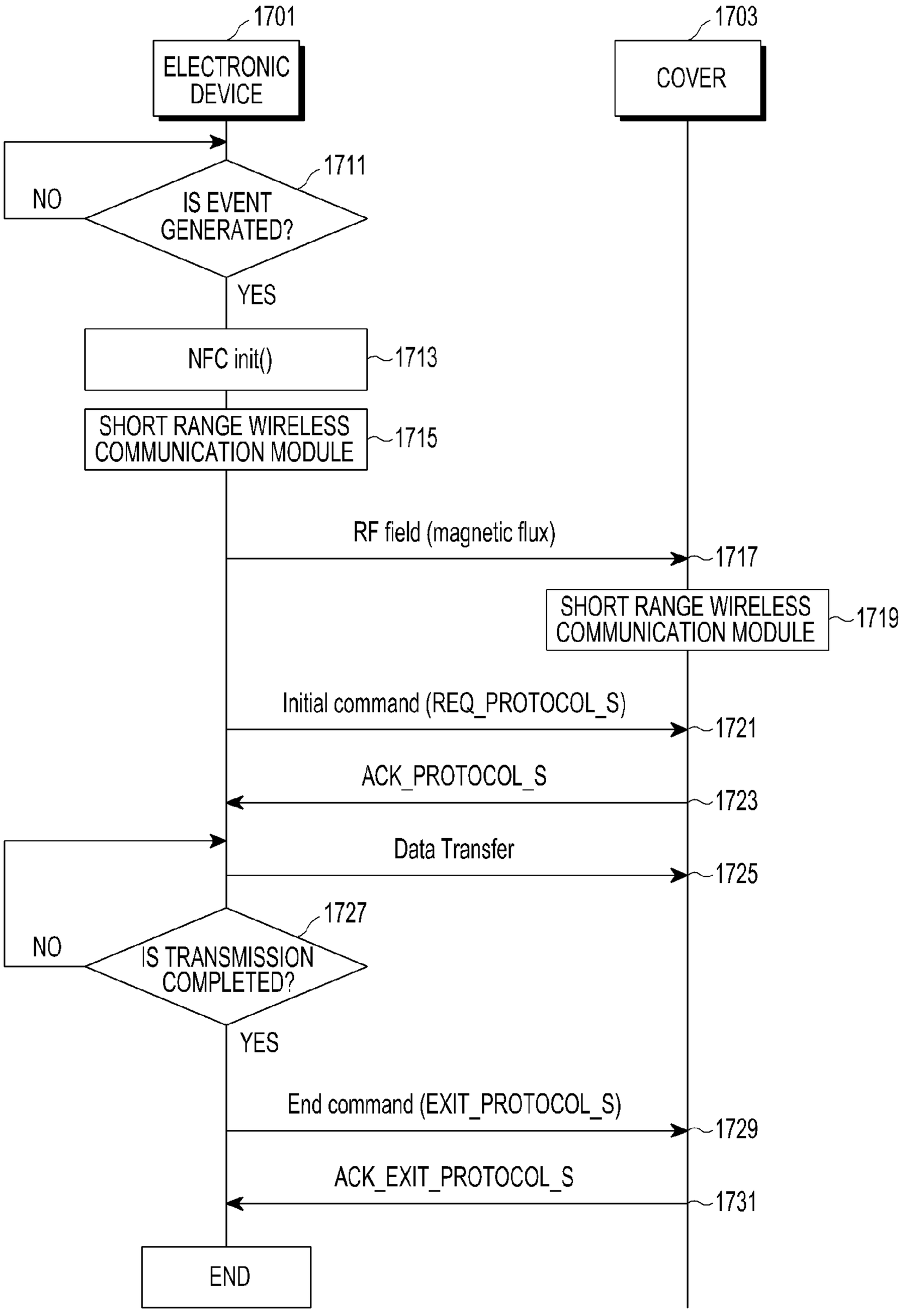

1701
ELECTRONIC DEVICE
1703
COVER
1711
NO
IS EVENT GENERATED?
YES
NFC init()
1713
SHORT RANGE WIRELESS COMMUNICATION MODULE
1715
RF field (magnetic flux)
1717
SHORT RANGE WIRELESS COMMUNICATION MODULE
1719
Initial command (REQ_PROTOCOL_S)
1721
ACK_PROTOCOL_S
1723
Data Transfer
1725
1727
NO
IS TRANSMISSION COMPLETED?
YES
End command (EXIT_PROTOCOL_S)
1729
ACK_EXIT_PROTOCOL_S
1731
END

FIG.17

```
NFC init(event,...){
  ...
  Switch(event){
    ...
    Protocol_TypeA();
    Protocol_TypeB();
    Protocol_TypeF();
    ISO_15693();
    ...
    Protocol_S(); // cover event
    ...
  }
}
```

FIG.18

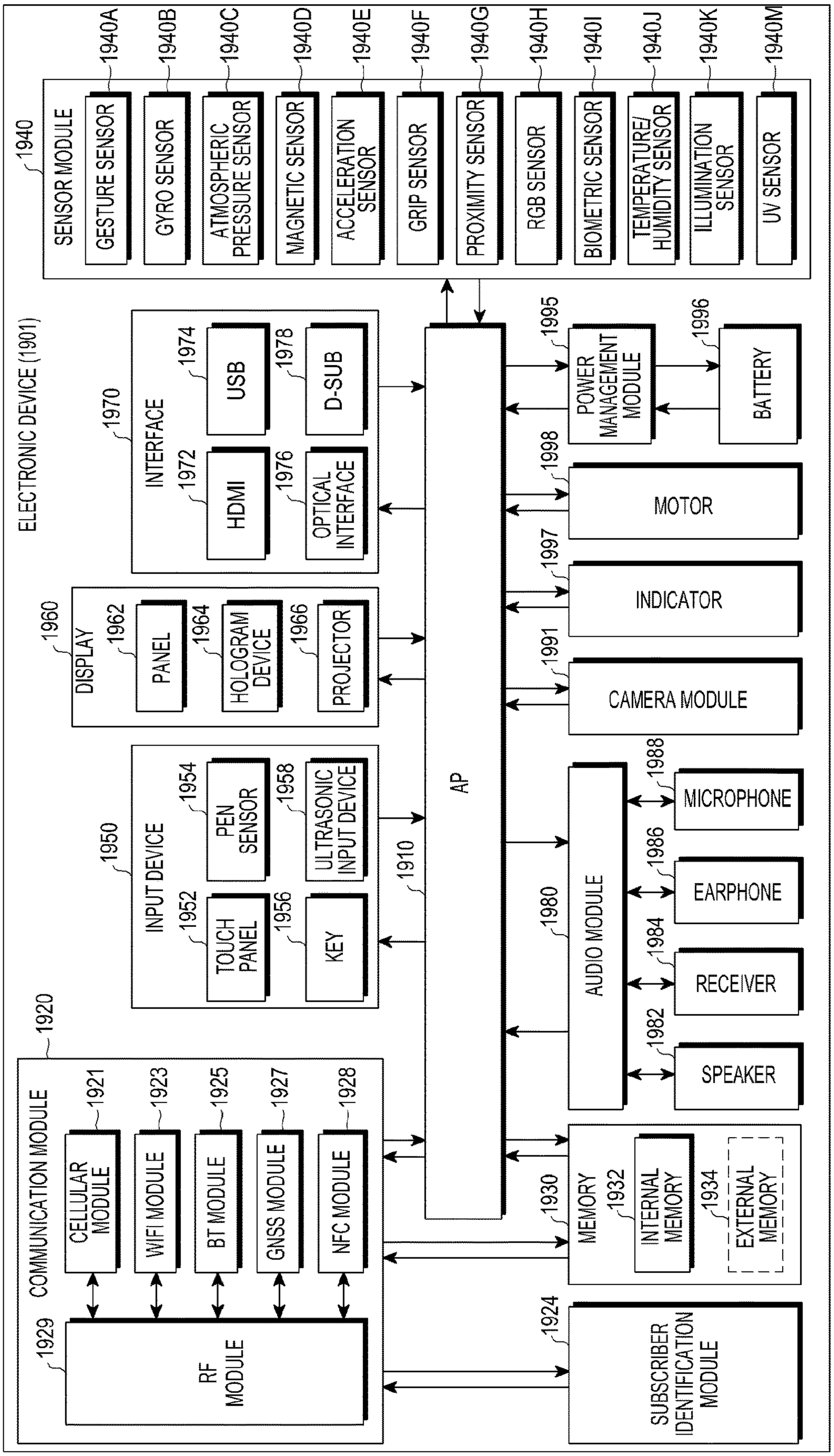

ELECTRONIC DEVICE (1901)
1940
SENSOR MODULE
1940A GESTURE SENSOR
1940B GYRO SENSOR
1940C ATMOSPHERIC PRESSURE SENSOR
1940D MAGNETIC SENSOR
1940E ACCELERATION SENSOR
1940F GRIP SENSOR
1940G PROXIMITY SENSOR
1940H RGB SENSOR
1940I BIOMETRIC SENSOR
1940J TEMPERATURE/ HUMIDITY SENSOR
1940K ILLUMINATION SENSOR
1940M UV SENSOR
1970
INTERFACE
1974 USB
1978 D-SUB
1972 HDMI
1976 OPTICAL INTERFACE
1960
DISPLAY
1962 PANEL
1964 HOLOGRAM DEVICE
1966 PROJECTOR
1950
INPUT DEVICE
1952 TOUCH PANEL
1954 PEN SENSOR
1956 KEY
1958 ULTRASONIC INPUT DEVICE
1910
AP
1995
POWER MANAGEMENT MODULE
1996
BATTERY
1998
MOTOR
1997
INDICATOR
1991
CAMERA MODULE
1980
AUDIO MODULE
1988 MICROPHONE
1986 EARPHONE
1984 RECEIVER
1982 SPEAKER
1930
MEMORY
1932 INTERNAL MEMORY
1934 EXTERNAL MEMORY
1924
SUBSCRIBER IDENTIFICATION MODULE
1920
COMMUNICATION MODULE
1921 CELLULAR MODULE
1923 WIFI MODULE
1925 BT MODULE
1927 GNSS MODULE
1928 NFC MODULE
1929
RF MODULE

FIG. 19

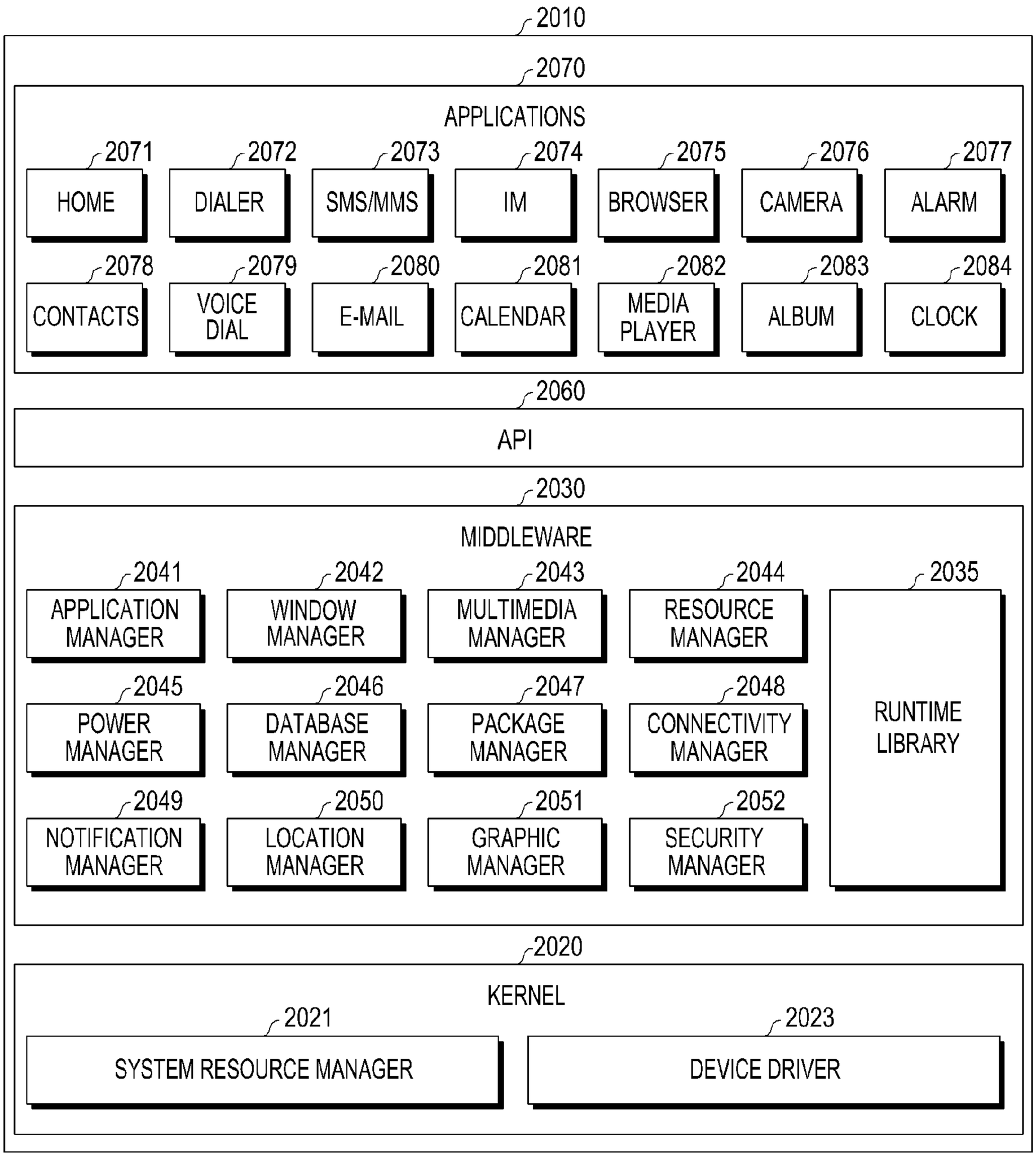

2010
2070
APPLICATIONS
2071
HOME
2072
DIALER
2073
SMS/MMS
2074
IM
2075
BROWSER
2076
CAMERA
2077
ALARM
2078
CONTACTS
2079
VOICE DIAL
2080
E-MAIL
2081
CALENDAR
2082
MEDIA PLAYER
2083
ALBUM
2084
CLOCK
2060
API
2030
MIDDLEWARE
2041
APPLICATION MANAGER
2042
WINDOW MANAGER
2043
MULTIMEDIA MANAGER
2044
RESOURCE MANAGER
2035
RUNTIME LIBRARY
2045
POWER MANAGER
2046
DATABASE MANAGER
2047
PACKAGE MANAGER
2048
CONNECTIVITY MANAGER
2049
NOTIFICATION MANAGER
2050
LOCATION MANAGER
2051
GRAPHIC MANAGER
2052
SECURITY MANAGER
2020
KERNEL
2021
SYSTEM RESOURCE MANAGER
2023
DEVICE DRIVER

FIG.20

ELECTRONIC DEVICE AND METHOD FOR SHORT RANGE WIRELESS COMMUNICATION IN THE ELECTRONIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS AND CLAIM OF PRIORITY

This application is a continuation of application Ser. No. 16/716,190, filed Dec. 16, 2019, which is a continuation of application Ser. No. 16/036,429, filed Jul. 16, 2018, now U.S. Pat. No. 10,511,348, which is a continuation of application Ser. No. 15/411,908, filed Jan. 20, 2017, now U.S. Pat. No. 10,027,380, which claims priority to Korean Application Serial No. 10-2016-0007716, filed Jan. 21, 2016, the disclosures of which are hereby incorporated by reference.

BACKGROUND

1. Field

The present disclosure relates to an electronic device and a method for short range wireless communication in an electronic device.

2. Description of Related Art

Short range wireless communication may be used for many devices and services and may be performed based on a tag technology in which a tag receives wireless power. Accordingly, wireless power of short range wireless communication used for neighboring devices may be charged.

SUMMARY

A short range wireless communication technology has been developed to a technology that may provide various services through the supply of wireless power to neighboring devices and communication with the neighboring devices.

However, in such a short range wireless communication technology, wireless power is charged in a separate neighboring device, the neighboring device is driven by the charged power, and a service is provided through communication with the neighboring device. Further, the neighboring device that performs short range wireless communication with the electronic device may use only the short range wireless communication or may include a separate battery and drive or operate with power supplied from the battery.

In addition, when the electronic device communicates with an external device through short range wireless communication, power for the short range wireless communication is limited and the short range wireless communication supports only one-to-one communication with the tag. Accordingly, in short range wireless communication in a tag type, the electronic device has difficulty in performing another function.

When information provided by an accessory device such as a cover connected to the electronic device is executed, much power is used. However, due to the characteristic of the accessory device connected to the electronic device, the accessory device should be slim and implemented in a simple form, so it is difficult to install a separate battery. In order to resolve the difficulty, the electronic device may provide power to the accessory device through short range wireless communication.

However, when the electronic device communicates with another external device through short range wireless communication in the tag type, the short range communication with the accessory device is blocked and thus the electronic device has difficulty in supplying sufficient power to the accessory device. Further, since the accessory device should wait until the short range communication with the other device is completed, the accessory device has difficulty in smoothly receiving information provided by the electronic device.

To address the above-discussed deficiencies, it is a primary object to provide an electronic device and a method by which an electronic device supplies wireless power to a neighboring device through short range wireless communication and performs the short range wireless communication with the neighboring device.

An electronic device according to one of various embodiments of the present disclosure to solve the aforementioned problems or other problems may include: a communication unit that communicates with a cover connected to the electronic device through short range wireless communication; and a controller, wherein the controller is configured to determine generation of an event related to the cover, supply power to the cover through wireless communication when the event is generated, make a control to transmit event information to the cover through the short range wireless communication to display the event information on the cover when the cover is driven by the supplied power, and switch to a standby mode after releasing a communication connection with the cover when an operation of the cover according to the event is completed.

A method of short range wireless communication in an electronic device according to one of various embodiments of the present disclosure may include: when a cover is connected to the electronic device through a short range wireless communication connection, determining generation of an event related to the cover; when the event is generated, supplying power to the cover through wireless communication; when the cover is driven by the supplied power, transmitting event information to the cover through the short range wireless communication connection to display the event information on the cover; and when an operation of the cover according to the event is completed, switching to a standby mode after releasing the short range wireless communication connection with the cover.

An accessory device according to one of various embodiments may include a housing including a first surface and a second surface facing an opposite side to the first surface; a combination structure connected to the housing and making the second surface attachable to/detachable from one surface of an external electronic device; a display formed on at least a part of the first surface; and a control circuit disposed inside the housing and electrically connected to the display. The control circuit may include a conductive pattern arranged inside the housing near the second surface of the housing, the conductive pattern configured to receive a magnetic flux generated from the one surface of the external electronic device or a transmitted signal, a power storage device configured to at least temporarily store power induced by the magnetic flux, and a memory device configured to temporarily store at least a part of information included in the transmitted signal, and at least a part of the display configured to be activated using at least the part of the information and the power.

According to an electronic device and a method in an electronic device according to various embodiments, power may be supplied to a cover connected to an electronic device

through short range wireless communication, and the cover is driven. When the cover is driven, event information may be transmitted to the cover and displayed on the cover. When an operation of the cover is completed, the electronic device may enter a standby mode and recognize another external device.

Before undertaking the DETAILED DESCRIPTION below, it may be advantageous to set forth definitions of certain words and phrases used throughout this patent document: the terms "include" and "comprise," as well as derivatives thereof, mean inclusion without limitation; the term "or," is inclusive, meaning and/or; the phrases "associated with" and "associated therewith," as well as derivatives thereof, may mean to include, be included within, interconnect with, contain, be contained within, connect to or with, couple to or with, be communicable with, cooperate with, interleave, juxtapose, be proximate to, be bound to or with, have, have a property of, or the like; and the term "controller" means any device, system or part thereof that controls at least one operation, such a device may be implemented in hardware, firmware or software, or some combination of at least two of the same. It should be noted that the functionality associated with any particular controller may be centralized or distributed, whether locally or remotely. Definitions for certain words and phrases are provided throughout this patent document, those of ordinary skill in the art should understand that in many, if not most instances, such definitions apply to prior, as well as future uses of such defined words and phrases.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present disclosure and its advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which like reference numerals represent like parts:

FIG. **1** illustrates a network environment according to various embodiments of the present disclosure;

FIG. **2** illustrates an example of a configuration of an electronic device and external devices within a network environment according to various embodiments of the present disclosure;

FIG. **3** illustrates an example of a configuration of an electronic device according to various embodiments of the present disclosure;

FIG. **4** illustrates an example of a configuration of an electronic device according to various embodiments of the present disclosure;

FIG. **5** illustrates an example of a configuration of an electronic device according to various embodiments of the present disclosure;

FIG. **6** illustrates an example of an antenna configuration of a cover connected to an electronic device according to various embodiments of the present disclosure;

FIG. **7** illustrates an example of an antenna configuration of a cover connected to an electronic device according to various embodiments of the present disclosure;

FIG. **8** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **9** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **10** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **11** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **12** illustrates an example of an operation of the electronic device in a standby mode according to various embodiments of the present disclosure;

FIG. **13** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **14** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **15** illustrates an example of a configuration of an electronic device according to various embodiments;

FIG. **16** illustrates an example of a memory map according to various embodiments of the present disclosure;

FIG. **17** illustrates an operation procedure of the electronic device according to various embodiments of the present disclosure;

FIG. **18** illustrates an example of a program of an electronic device related to short range wireless communication according to various embodiments of the present disclosure;

FIG. **19** illustrates a block diagram of an electronic device according to various embodiments; and

FIG. **20** illustrates a block diagram of a program module according to various embodiments.

DETAILED DESCRIPTION

FIGS. **1** through **20**, discussed below, and the various embodiments used to describe the principles of the present disclosure in this patent document are by way of illustration only and should not be construed in any way to limit the scope of the disclosure. Those skilled in the art will understand that the principles of the present disclosure may be implemented in any suitably arranged electronic device or method of operating an electronic device in wireless communication.

Hereinafter, various embodiments of the present disclosure will be described with reference to the accompanying drawings. However, it should be understood that there is no intent to limit the present disclosure to the particular forms disclosed herein; rather, the present disclosure should be construed to cover various modifications, equivalents, and/or alternatives of embodiments of the present disclosure. In describing the drawings, similar reference numerals may be used to designate similar constituent elements.

As used herein, the expression "have", "may have", "include", or "may include" refers to the existence of a corresponding feature (e.g., numeral, function, operation, or constituent element such as component), and does not exclude one or more additional features.

In the present disclosure, the expression "A or B", "at least one of A or/and B", or "one or more of A or/and B" may include all possible combinations of the items listed. For example, the expression "A or B", "at least one of A and B", or "at least one of A or B" refers to all of (1) including at least one A, (2) including at least one B, or (3) including all of at least one A and at least one B.

The expression "a first", "a second", "the first", or "the second" used in various embodiments of the present disclosure may modify various components regardless of the order and/or the importance but does not limit the corresponding components. For example, a first user device and a second user device indicate different user devices although both of them are user devices. For example, a first element may be termed a second element, and similarly, a second element

may be termed a first element without departing from the scope of the present disclosure.

It should be understood that when an element (e.g., first element) is referred to as being (operatively or communicatively) "connected," or "coupled," to another element (e.g., second element), it may be directly connected or coupled directly to the other element or any other element (e.g., third element) may be interposer between them. In contrast, it may be understood that when an element (e.g., first element) is referred to as being "directly connected," or "directly coupled" to another element (second element), there are no element (e.g., third element) interposed between them.

The expression "configured to" used in the present disclosure may be exchanged with, for example, "suitable for", "having the capacity to", "designed to", "adapted to", "made to", or "capable of" according to the situation. The term "configured to" may not necessarily imply "specifically designed to" in hardware. Alternatively, in some situations, the expression "device configured to" may mean that the device, together with other devices or components, "is able to". For example, the phrase "processor adapted (or configured) to perform A, B, and C" may mean a dedicated processor (e.g., embedded processor) only for performing the corresponding operations or a generic-purpose processor (e.g., central processing unit (CPU) or application processor (AP)) that can perform the corresponding operations by executing one or more software programs stored in a memory device.

The terms used herein are merely for the purpose of describing particular embodiments and are not intended to limit the scope of other embodiments. As used herein, singular forms may include plural forms as well unless the context clearly indicates otherwise. Unless defined otherwise, all terms used herein, including technical and scientific terms, have the same meaning as those commonly understood by a person skilled in the art to which the present disclosure pertains. Such terms as those defined in a generally used dictionary may be interpreted to have the meanings equal to the contextual meanings in the relevant field of art, and are not to be interpreted to have ideal or excessively formal meanings unless clearly defined in the present disclosure. In some cases, even the term defined in the present disclosure should not be interpreted to exclude embodiments of the present disclosure.

An electronic device according to various embodiments of the present disclosure may include at least one of, for example, a smart phone, a tablet Personal Computer (PC), a mobile phone, a video phone, an electronic book reader (e-book reader), a desktop PC, a laptop PC, a netbook computer, a workstation, a server, a Personal Digital Assistant (PDA), a Portable Multimedia Player (PMP), a MPEG-1 audio layer-3 (MP3) player, a mobile medical device, a camera, and a wearable device. According to various embodiments, the wearable device may include at least one of an accessory type (e.g., a watch, a ring, a bracelet, an anklet, a necklace, a glasses, a contact lens, or a Head-Mounted Device (MID)), a fabric or clothing integrated type (e.g., an electronic clothing), a body-mounted type (e.g., a skin pad, or tattoo), and a bio-implantable type (e.g., an implantable circuit).

According to some embodiments, the electronic device may be a home appliance. The home appliance may include at least one of, for example, a television, a Digital Video Disk (DVD) player, an audio, a refrigerator, an air conditioner, a vacuum cleaner, an oven, a microwave oven, a washing machine, an air cleaner, a set-top box, a home automation control panel, a security control panel, a TV box (e.g., Samsung HomeSync™, Apple TV™, or Google TV™), a game console (e.g., Xbox™ and PlayStation™), an electronic dictionary, an electronic key, a camcorder, and an electronic photo frame.

According to another embodiment, the electronic device may include at least one of various medical devices (e.g., various portable medical measuring devices (a blood glucose monitoring device, a heart rate monitoring device, a blood pressure measuring device, a body temperature measuring device, etc.), a Magnetic Resonance Angiography (MRA), a Magnetic Resonance Imaging (MRI), a Computed Tomography (CT) machine, and an ultrasonic machine), a navigation device, a Global Positioning System (GPS) receiver, an Event Data Recorder (EDR), a Flight Data Recorder (FDR), a Vehicle Infotainment Devices, an electronic devices for a ship (e.g., a navigation device for a ship, and a gyro-compass), avionics, security devices, an automotive head unit, a robot for home or industry, an automatic teller's machine (ATM) in banks, point of sales (POS) in a shop, or internet device of things (e.g., a light bulb, various sensors, electric or gas meter, a sprinkler device, a fire alarm, a thermostat, a streetlamp, a toaster, a sporting goods, a hot water tank, a heater, a boiler, etc.).

According to some embodiments, the electronic device may include at least one of a part of furniture or a building/structure, an electronic board, an electronic signature receiving device, a projector, and various kinds of measuring instruments (e.g., a water meter, an electric meter, a gas meter, and a radio wave meter). In various embodiments, the electronic device may be a combination of one or more of the aforementioned various devices. According to some embodiments, the electronic device may also be a flexible device. Further, the electronic device according to an embodiment of the present disclosure is not limited to the aforementioned devices, and may include a new electronic device according to the development of technology.

Hereinafter, an electronic device according to various embodiments will be described with reference to the accompanying drawings. In the present disclosure, the term "user" may indicate a person using an electronic device or a device (e.g., an artificial intelligence electronic device) using an electronic device.

An electronic device **101** within a network environment **100**, according to various embodiments, will be described with reference to FIG. **1**. The electronic device **101** may include a bus **110**, a processor **120**, a memory **130**, an input/output interface **150**, a display **160**, and a communication interface **170**. In some embodiments, the electronic device **101** may omit at least one of the elements, or may further include other elements.

The bus **110** may include, for example, a circuit that interconnects the elements **110** to **170** and delivers communication (for example, a control message and/or data) between the elements **110** to **170**.

The processor **120** may include one or more of a Central Processing Unit (CPU), an Application Processor (AP), and a Communication Processor (CP). The processor **120**, for example, may carry out operations or data processing relating to the control and/or communication of at least one other element of the electronic device **101**.

The memory **130** may include a volatile and/or non-volatile memory. The memory **130** may store, for example, instructions or data relevant to at least one other element of the electronic device **101**. According to an embodiment, the memory **130** may store software and/or a program **140**. The program **140** may include a kernel **141**, middleware **143**, an

Application Programming Interface (API) **145**, and/or application programs (or "applications") **147**. At least some of the kernel **141**, the middleware **143**, and the API **145** may be referred to as an Operating System (OS).

The kernel **141** may control or manage system resources (for example, the bus **110**, the processor **120**, or the memory **130**) used for executing an operation or function implemented by other programs (for example, the middleware **143**, the API **145**, or the application programs **147**). Furthermore, the kernel **141** may provide an interface through which the middleware **143**, the API **145**, or the application programs **147** may access the individual elements of the electronic device **101** to control or manage the system resources.

The middleware **143** may function as, for example, an intermediary for allowing the API **145** or the application programs **147** to communicate with the kernel **141** to exchange data.

Furthermore, the middleware **143** may process one or more task requests, which are received from the application programs **147**, according to priorities thereof. For example, the middleware **143** may assign priorities for using the system resources (for example, the bus **110**, the processor **120**, the memory **130**, and the like) of the electronic device **101** to one or more of the application programs **147**. For example, the middleware **143** may perform scheduling or loading balancing on the one or more task requests by processing the one or more task requests according to the priorities assigned to the one or more application programs.

The API **145**, which is an interface through which the application programs **147** control functions provided from the kernel **141** or the middleware **143**, may include, for example, at least one interface or function (for example, an instruction) for file control, window control, image processing, text control, and the like.

The input/output interface **150** may function as, for example, an interface that may forward instructions or data, which is input from a user or another external device, to the other element(s) of the electronic device **101**. Furthermore, the input/output interface **150** may output instructions or data, which are received from the other element(s) of the electronic device **101**, to the user or the external device.

Examples of the display **160** may include a Liquid Crystal Display (LCD), a Light-Emitting Diode (LED) display, an Organic Light-Emitting Diode (OLED) display, a MicroElectroMechanical Systems (MEMS) display, and an electronic paper display. The display **160** may display, for example, various types of contents (for example, text, images, videos, icons, or symbols) to the user. The display **160** may include a touch screen and may receive, for example, a touch, gesture, proximity, or hovering input using an electronic pen or the user's body part.

The communication interface **170** may configure communication, for example, between the electronic device **101** and an external device (for example, a first external electronic device **102**, a second external electronic device **104**, or a server **106**). For example, the communication interface **170** may be connected to a network **162** through wireless or wired communication to communicate with the external device (for example, the second external electronic device **104** or the server **106**).

The wireless communication may use, for example, at least one of Long Term Evolution (LTE), LTE-Advance (LTE-A), Code Division Multiple Access (CDMA), Wideband CDMA (WCDMA), Universal Mobile Telecommunications System (UMTS), WiBro (Wireless Broadband), Global System for Mobile Communications (GSM) and the like, for example, as a cellular communication protocol. In addition, the wireless communication may include, for example, short range communication **164**. The short range communication **164** may include at least one of, for example, Wi-Fi, Bluetooth™, Near Field Communication (NFC), Magnetic Stripe Transmission (MST), and Global Navigation Satellite System (GNSS). The GNSS may include, for example, at least one of a Global Positioning System (GPS), a Global navigation satellite system (Glonass), a Beidou Navigation satellite system (hereinafter, referred to as "Beidou"), Galileo, and the European Global satellite-based navigation system according to a place of usage, a bandwidth, or the like. Hereinafter, in the present disclosure, the "GPS" may be interchangeably used with the "GNSS". The wired communication may include, for example, at least one of a Universal Serial Bus (USB), a High Definition Multimedia Interface (HDMI), Recommended Standard 232 (RS-232), a Plain Old Telephone Service (POTS), and the like. The network **162** may include at least one of a communication network such as a computer network (for example, a LAN or a WAN), the Internet, and a telephone network.

Each of the first and second external electronic devices **102** and **104** may be of a type identical to or different from that of the electronic device **101**. According to an embodiment, the server **106** may include a group of one or more servers. According to various embodiments, all or some of the operations executed in the electronic device **101** may be executed in another electronic device or a plurality of electronic devices (for example, the electronic devices **102** and **104** or the server **106**). According to an embodiment, when the electronic device **101** has to perform some functions or services automatically or in response to a request, the electronic device **101** may request another device (for example, the electronic device **102** or **104** or the server **106**) to perform at least some functions relating thereto instead of, or in addition to, performing the functions or services by itself. The other electronic device (for example, the electronic device **102** or **104** or the server **106**) may perform the requested functions or the additional functions and may transfer the execution result to the electronic device **101**. The electronic device **101** may provide the received result as it is, or may additionally process the received result to provide the requested functions or services. To this end, for example, cloud computing, distributed computing, or client-server computing technology may be used.

Hereinafter, an electronic device according to various embodiments of the present disclosure will be described with reference to the accompanying drawings.

FIG. **2** illustrates a configuration example of an electronic device and external devices within a network environment according to various embodiments of the present disclosure.

Referring to FIG. **2**, according to various embodiments of the present disclosure, the network environment corresponds to a network for wireless short range communication and may include an electronic device **210** and an external device (for example, at least one of an accessory device (for example, a cover **220**) and an NFC device **230**, or an electronic device **102** or **104**) connected through the short range wireless communication.

The electronic device **210** (for example, the electronic device **101** of FIG. **1**) may include at least one of a controller **211**, a communication unit **212**, an input unit **213**, a storage unit **214**, and a display unit **215**. According to various embodiments of the present disclosure, the controller **211** (for example, the processor **120** of FIG. **1**) may process information according to an operation of the electronic

device, or information according to an execution of a program, an application, or a function, and may make a control to display the processed information on the display unit **215** or to output the processed information through an audio module (not shown).

According to various embodiments of the present disclosure, the controller **211** may make a control to display various type of information (contents) in entire or partial areas of the screen of the display unit.

Further, according to various embodiments of the present disclosure, the controller **211** may make a control to perform short range wireless communication with external devices and make a control to transmit/receive data to/from the external device (for example, the cover **220** or the NFC device **230**) through the short range wireless communication.

According to various embodiments, the controller **211** may transmit at least one piece of information which may be displayed on the display unit **215** or information generated according to a particular event to the external device (for example, the cover **220**) connected through the wireless short range communication (NFC) and control the external device (for example, the cover **220**) to display the received information. The event may include at least one of recognition of coupling of the cover **220** to the electronic device **210**, an execution of an application for a cover operation, and generation of information according to a set function (for example, at least one of a phone call, a message, and a set event).

According to various embodiments of the present disclosure, the controller **211** may periodically search for a wireless signal (for example, an NFC signal) generated by external devices that are located near the electronic device **210** and capable of performing short range wireless communication and identify the external devices capable of performing the short range wireless communication through the found wireless signal. According to various embodiments, the controller **211** may divide time during a preset period, set a time internal corresponding to each of short range wireless communication types, search for a wireless signal (for example, an NFC signal) of the corresponding type at the set time, and identify whether there is a neighboring external device corresponding to the corresponding type.

Further, according to various embodiments of the present disclosure, when short range wireless communication is performed with the neighboring external device (for example, the cover **220**) requiring power, the controller **211** may set a connection with the cover **220** and supply wireless power to the cover **220** through an induced current of at least one antenna included in an antenna module **212***a*. Accordingly, the wireless power may be supplied to the cover **220** for a predetermined time and the cover **220** may transmit a response signal to the electronic device **210**. Further, when receiving the response signal that informs of the driving of the cover **220**, the controller **211** may perform a short range wireless communication connection with the cover **220** for data transmission/reception and transmit/receive data to/from the cover **220**.

According to various embodiments, when the cover **220** is connected, the controller **211** may recognize the cover **220**, make a short range wireless communication (for example, NFC) connection, read information on the cover **220**, execute an application for an operation of the cover **220**, and transmit configuration information indicating the set operation of the cover **220** through the executed application to the cover **220** based on the short range wireless communication. After transmitting the configuration information, the controller **211** may disconnect the short range wireless communication connected to the cover **220**, switch to a standby mode state, and search for another external device (for example, the NFC device).

According to various embodiments, the controller **211** may identify whether an event for the cover **220** is generated and, when the event is generated, may transmit information (hereinafter, referred to as event information) related to the generated event to the cover **220** through NFC. The controller **211** may identify whether an operation for displaying the event information transmitted by the cover **220** is completed and, when the displaying of the event information is completed, may stop the NFC with the cover **220**. When the NFC with the cover **220** is stopped, the controller **211** may switch to the standby mode again and search for an NFC signal, that is, whether there is an approaching NFC device (for example, an NFC polling operation).

According to various embodiments, the controller **211** may ignore signals generated by other NFC devices during the NFC with the cover **220** and first perform the NFC with the cover **220**. Further, according to various embodiments, the controller **211** may not perform the operation of searching for the NFC signal that is performed in the standby mode while the NFC with the cover **220** is performed, and, when switching to the standby mode, perform the operation of searching for the NFC signal.

Further, according to various embodiments of the present disclosure, the controller **211** may determine generation of a first event by the cover **220** and, when the first event is generated, may supply power to the cover **220** and determine whether a second event is generated using the NFC for a predetermined time during which power is supplied to the cover. In addition, when the operation of the cover is identified after the predetermined time passes, the controller **211** may transmit first event information to the cover through the NFC. Accordingly, the cover may display the first event information according to the first event. When the second event is generated while the first event information is transmitted to the cover through the NFC, the controller **211** may first transmit the first event information to the cover through the NFC regardless of the second event.

Further, according to various embodiments of the present disclosure, the controller **211** may include an NFC control module (not shown) for controlling short range wireless communication with the cover **220** or the external device (for example, the NFC device **230**) and a power control module (not shown) for controlling an operation for battery charging or discharging through a wireless charging scheme and controlling an operation of supplying power to at least one external device (for example, the cover **220** or the NFC device **230**). According to various embodiments, the power control module (not shown) may be configured separately from the controller **211** and may charge power wirelessly supplied through the antenna module **212***a* in a battery (not shown) according to a control of the controller **211**. Further, according to various embodiments, the controller **211** may include a separate cover control module (not shown) for controlling the operation of the cover. According to various embodiments, in a case where, for example, an NFC polling operation is used, when the standby mode state is maintained and the NFC control module of the controller **211** receives a control signal, the cover control module may switch to a cover mode, operate in the cover mode for a predetermined time, and switch back to the standby mode. The cover control module may control the antenna module **212***a* to be activated in the cover mode, and make a control to transmit

an RF signal including information related to a cover event to the cover **220** through the antenna module **212***a*. Further, according to various embodiments, the cover control module may receive information on a search period (for example, an NFC polling period) from the controller **211** and, when a cover mode time interval arrives, switch to the cover mode even though the control signal is not received from the controller **211** based on the information on the received search period. All functions of the cover control module according to the various embodiments as described above may be included in the controller **211** and performed by the controller **211**.

Further, according to various embodiments, when a wireless charging operation is activated and the controller **211** switches to the cover mode in a state where power is supplied to the battery, the controller **211** may deactivate the wireless charging operation, transmit a wireless (RF) signal including event information generated in the cover mode to the cover through the antenna module **212***a*, and supply power to the cover **220**. In addition, according to various embodiments, when the wireless charging operation is activated and an event is generated in the cover mode in the state where power is supplied to the battery, the controller **211** may deactivate the wireless charging operation, transmit a wireless signal including event information according to generation of the event to the cover **220**, and supply power to the cover **220**. When the transmission of the event information is completed, the controller **211** may make a control to activate the wireless charging operation again and wirelessly charge the battery. When a wireless charging antenna (not shown) is activated according to the wireless charging operation, the wireless signal by NFC may receive interference by the wireless charging operation. Accordingly, the controller **211** may deactivate the wireless charging operation in the cover mode or when the event is generated in the cover mode.

Further, according to various embodiments, when the wireless charging is performed, that is, the wireless charging operation is activated, the controller **211** may maintain a connected state (NFC attach) without releasing the connection with the antenna module **212***a*. When the switching to the cover mode is made and the event is generated, the controller **211** may control transmission power (Tx power) for wireless charging to be lower so that the wireless signal through NFC can be transmitted without any interference by the wireless charging.

According to various embodiments, the controller **211** may correspond to a hardware module or a software module (for example, an application program) and may be a hardware component (function) or a software component (program) including at least one of various sensors included in the electronic device, a data measurement module, an input/output interface, a module for managing a state or an environment of the electronic device, and a communication module.

Further, according to various embodiments of the present disclosure, the controller **211** of the electronic device may be at least a part of the processor, and may include, for example, a combination of one or more of hardware, software, and firmware. According to various embodiments, the controller **211** may omit at least some of the aforementioned elements or may further include other elements for performing an image processing operation as well as the aforementioned elements.

According to various embodiments of the present disclosure, at least some elements of the controller **211** of the electronic device may include, in hardware, at least some of at least one processor including a Central Processing Unit (CPU)/Micro Processing Unit (MPU), a memory (for example, a register and/or a Random Access Memory (RAM)) to which at least one piece of memory loading data is loaded, and a bus for inputting/outputting at least one piece of data to the processor and the memory. Further, the controller **211** may include, in software, a predetermined program routine or program data which is loaded to the memory from a predetermined recording medium to perform a function defined in the electronic device and operation-processed by the processor.

According to various embodiments of the present disclosure, the communication unit **212** (for example, the communication interface **170** of FIG. **1**) of the electronic device may communicate with another electronic device or an external device (for example, the electronic device **102** or **104** of FIG. **1** or the server **106**) according to a control of the controller **211**. According to various embodiments, the communication unit **212** may transmit/receive data related to an executed operation to/from the external device according to a control of the controller **211**. The communication unit **212** may be connected to the network using wireless communication or wired communication through the communication interface or perform communication through a connection between devices. The wireless communication may include at least one of, for example, Wi-Fi, Bluetooth™ (BT), Near Field Communication (NFC), Global Positioning System (GPS), and cellular communication (for example, LTE, LTE-A, CDMA, WCDMA, UMTS, WiBro, GSM or the like). The wired communication may include at least one of, for example, a Universal Serial Bus (USB), a High Definition Multimedia Interface (HDMI), Recommended Standard 232 (RS-232), a Plain Old Telephone Service (POTS), a Universal Asynchronous Receiver Transmitter (UART), an Inter-Integrated Circuit (I2C), a Serial Peripheral Interface (SPI), and a Controller Area Network (CAN). Further, the communication unit **212** may include all types of communication schemes which have been widely known or will be developed in the future as well as the aforementioned communication schemes.

According to various embodiments of the present disclosure, the communication unit **212** may be connected to at least one neighboring external device (for example, the cover **220** or the NFC device **230**) (for example, the electronic device **102** or **104** of FIG. **1**) capable of performing short range wireless communication and perform short range wireless communication.

According to various embodiments of the present disclosure, when the cover **220** is connected to the housing according to a control of the controller **211**, the communication unit **212** may transmit/receive a signal for a short range communication connection to/from the cover **220** and, when the short range communication is connected, transmit/receive data.

According to various embodiments of the present disclosure, the communication unit **212** may include at least one antenna (for example, the antenna module **212***a* including an NFC antenna) for short range wireless communication or a short range wireless communication module **212***b* (for example, an NFC chip (IC)). The antenna module **212***a* may transmit/receive a signal for an NFC connection and data transmission/reception. Further, when the external device (for example, the cover **220**) to which power will be supplied is connected, the antenna module **212***a* may generate an induced current and supply wireless power to the cover **220**. The short range wireless communication module **212***b* may include a function for the short range wireless

communication and perform the function according to a control of the controller **211**. According to various embodiments, when the number of antenna modules **212***a* is plural, the antenna modules **212***a* may be divided into a main antenna for transmitting/receiving a wireless signal and an antenna for supplying wireless power. Further, according to various embodiments of the present disclosure, the communication unit **212** may further include an antenna (for example, a wireless power loop coil) for wireless charging to supply wireless power to a battery.

According to various embodiments of the present disclosure, the input unit **213** of the electronic device (for example, the input/output interface **150** of FIG. **1**) may transfer, to the controller **211**, various pieces of information such as number and character information input by the user, various function settings, and signals which are input in connection with a control of functions of the electronic device. Further, the input unit **213** may support a user input for executing a module or an application that supports a particular function. The input unit **213** may include at least one of a key input means such as a keyboard or a keypad, a touch input means such as a touch sensor or a touch pad, a sound source input means, a camera, various sensors, and a gesture input means. In addition, the input unit **213** may include all types of input means which are being developed currently or will be developed in the future. According to various embodiments of the present disclosure, the input unit **213** may receive information input by the user from the user through a touch panel of the display unit or a camera and may transfer the input information to the controller **211**.

According to various embodiments of the present disclosure, the input unit **213** may transfer information related to a user's gesture received through the camera or various sensors to the controller **211**. Further, the input unit **213** may transfer an input signal according to a selection of at least one object (for example, content) displayed on the screen to the controller **211**.

According to various embodiments of the present disclosure, the input unit **213** may receive an input signal for switching a mode from the user through the sound source input means and transfer the input signal to the controller **211**.

According to various embodiments, when an application for NFC with the cover **220** is executed as the mounting of the cover **220** is recognized, the input unit **213** may receive user input information for a function provided by the executed application. Further, the input unit **213** may receive setting information for short range communication from the user.

According to various embodiments of the present disclosure, the storage unit **214** (not shown) (for example, the memory **130** of FIG. **1**) of the electronic device may temporarily store various pieces of data generated during an execution of programs including a program used for a function operation according to various embodiments. The storage unit **214** may largely include a program area and a data area. The program area may store pieces of information related to driving of the electronic device such as an Operating System (OS) that boots the electronic device. The data area may store transmitted/received data or generated data according to various embodiments. Further, the storage unit **214** may include at least one storage medium of a flash memory, a hard disk, a multimedia card micro type memory (for example, an SD or XD memory), a RAM, and a ROM.

According to various embodiments of the present disclosure, the storage unit **214** may store information for short range wireless communication with an external device (for example, the cover **220** or the NFC device **230**) and transmitted/received data.

According to various embodiments of the present disclosure, the display unit **215** (for example, some elements of the input/output interface **150** of FIG. **1** or the display **160**) of the electronic device may output operation execution result information (for example, at least one of text, images, or videos) according to a control of the controller **211**.

According to various embodiments of the present disclosure, the display unit **215** may display an input pad (for example, a button) for inputting at least one of various characters, numbers, or symbols into an input window on the screen through various methods. Further, the display unit **215** may display a service execution screen according to an execution of various applications related to information transmission/reception. According to various embodiments, the display unit **215** may execute and display an application for short range wireless communication with the cover **220**. Further, the display unit **215** may display information on a function executed according to set conditions or user input information and, when at least one piece of the displayed information is transmitted to the cover **220** and displayed, may not display at least one piece of the transmitted information. That is, when an event for the cover is generated and event information is transmitted to the cover **220**, the display unit **215** may not display the event information.

According to various embodiments of the present disclosure, when the display unit **215** of the electronic device is implemented in the form of a touch screen, the display unit **215** may correspond to the touch screen of the input unit (not shown). When the display unit **215** and the input unit **213** are implemented together in the form of the touch screen, the display unit **215** may display various pieces of information generated according to a user's touch action.

According to various embodiments, the display unit **215** may be configured by at least one of a Liquid Crystal Display (LCD), a Thin Film transistor LCD (TFT-LCD), an Organic Light Emitting Diodes (OLEDs), LED, Active Matrix OLED (AMOLED), a flexible display, and a 3 dimensional display. Some of the displays may be implemented in a transparent type or a light transmission type so that the outside can be seen therethrough. The display may be implemented in a transparent display form including Transparent OLED (TOLED).

According to various embodiments of the present disclosure, the electronic device **210** may further include another installed display unit (for example, an extended display unit or a flexible display unit) as well as the display unit **215** and a display unit of another external electronic device (for example, at least one of an external display device, a wearable device, and an external terminal device) linked to the electronic device.

According to various embodiments of the present disclosure, the electronic device may further include an audio module (not shown) (for example, the input/output interface **150** of FIG. **1**). The audio module may output a sound and may include, for example, at least one of an audio codec, a microphone (MIC), a receiver, an earphone output (EAR_L), and a speaker. According to various embodiments, when voice information corresponding to the event information transmitted to the external device (for example, the cover **220**) through short range wireless communication is identified, the audio module may output the identified voice information in accordance with the event information displayed on the cover **220**. According to various embodi-

ments, the audio module may output various pieces of voice information for short range wireless communication.

According to various embodiments of the present disclosure, the electronic device may further include a means for outputting vibration or a means for outputting smell.

According to various embodiments of the present disclosure, main elements of the electronic device have been described through the electronic device of FIG. **2**. However, according to various embodiments of the present disclosure, all the elements illustrated in FIG. **2** are not necessary elements, and the electronic device may be implemented by more or less elements than the illustrated elements. Further, locations of the main elements of the electronic device illustrated in FIG. **2** may vary depending on various embodiments.

Referring back to FIG. **2**, according to various embodiments of the present disclosure, the first external device may be an accessory device (for example, the cover **220**) linked with the electronic device **210**, and may include at least one of a communication unit **221**, a controller **222**, a display driver **223**, and a display unit **224**. Further, according to various embodiments, the cover **220** may further include the controller **222**, the antenna module **221***a* including at least one short range wireless communication antenna of the communication unit **221**, or a rectifier circuit unit connected to the display driver **223** to supply power.

Further, the cover **220** may be implemented to be connected to the housing of the electronic device **210**.

According to various embodiments, the cover **220** may be implemented to cover the back surface of the electronic device **210**.

According to various embodiments of the present disclosure, the communication unit **221** may include the antenna module **221***a* including at least one antenna for short range wireless communication and a short range wireless communication module **221***b* (for example, the NFC chip (IC)). The antenna module **221***a* may transmit/receive a signal for an NFC connection and data transmission/reception. Further, when the device (for example, the electronic device **210**) to receive power is connected, the antenna module **212***a* may receive a wireless power signal, generate an induced current according to the received wireless power signal, and apply the power to the controller **222**, the display driver **223**, and the display unit **224**. The short range wireless communication module **212***b* may include a function for the short range wireless communication and perform the function according to a control of the controller **222**. According to various embodiments of the present disclosure, when the number of antennas included in the antenna module **221***a* is plural, the plurality of antennas may be disposed according to an antenna pattern of the electronic device **210**, and one predetermined antenna may operate as a main antenna for transmitting/receiving a wireless signal and at least one remaining antenna may operate as an antenna for receiving wireless power.

According to various embodiments, when the communication unit **221** is connected to the electronic device **210**, the communication unit **221** may receive the wireless power signal from the electronic device **210** and generate an induced current in the controller **222**. When a response signal according to device driving is received from the controller **222**, the communication unit **221** may transmit the response signal to the electronic device **210**. Further, in order to transmit/receive data (for example, setting information, event information, or operation completion information), the communication unit **221** may transmit/receive a signal for performing a short range wireless communication connection, and receive event information from the electronic device **210** as the event is generated and short range wireless communication is connected. In addition, the communication unit **221** may transmit information on the operation completion transmitted from the controller **222** to the electronic device **210**.

According to various embodiments of the present disclosure, the controller **222** (for example, a Micro Controller Unit (MCU) or a Field Programmable Gate Array (FPGA)) may perform a general control operation of the cover **220** and process information according to the operation of the cover **220** or an execution of a program, an application, or a function. Further, the controller **222** may transmit the processed information to the display unit **224** through the display driver **223** and make a control to display the processed information. The controller **222** may transmit the processed information to the communication unit **221** and make a control to transmit the processed information to the device (for example, the electronic device **210**) connected through short range wireless communication.

According to various embodiments of the present disclosure, when the controller **222** is connected to the electronic device **210**, the controller **222** may receive an induced current generated by the antenna module **221***a* and make a control to operate the cover **220**. According to various embodiments, when wireless power is supplied for a predetermined time, the controller **222** may turn on the cover **220**.

According to various embodiments, the controller **222** may generate a response signal according to device driving and make a control to transmit the response signal to the electronic device **210**, and may perform an operation for a short range wireless communication connection with the electronic device **210**. Further, as the short range wireless communication is connected, the controller **222** may make a control to transmit/receive information for an authentication of the cover **220** to/from the electronic device **210** and process an authentication performance operation. The controller **222** may process event information transmitted from the electronic device **210** and make a control to display the received event information on the display unit **224**.

According to various embodiments, the controller **222** may identify whether the event information is completely displayed and, when the event information is completely displayed, make a control to transmit an operation completion signal including information on the completion of the displaying to the electronic device **210**.

According to various embodiments, the controller **222** may make a control to apply power to the display unit **224** to maintain the displaying of the event information on the display unit **224** even in a state where the short range wireless communication connection with the electronic device **210** is released. For example, when short range wireless communication is connected through one antenna included in the antenna module **221***a* and power is supplied therethrough, the controller **222** may control the one antenna to receive wireless (RF) power signal for a predetermined time even in a state where the short range wireless communication connected is blocked.

According to various embodiments, in a case where the number of NFC antennas is plural, if wireless power is supplied through a sub antenna for supplying auxiliary power even in a state where short range wireless communication connection through a main antenna is blocked, the controller **222** may make a control to apply the supplied power to the display unit **224**.

According to various embodiments of the present disclosure, the controller **222** of the cover **220** may be at least a

part of the processor, and may include, for example, a combination of one or more of hardware, software, and firmware. According to various embodiments, the controller **222** may omit at least some of the aforementioned elements or may further include other elements for performing an image processing operation as well as the aforementioned elements.

According to various embodiments of the present disclosure, at least some elements of the controller **222** may include, in hardware, at least some of at least one processor including a Central Processing Unit (CPU)/Micro Processing Unit (MPU), a memory (for example, a register and/or a Random Access Memory (RAM)) to which at least one piece of memory loading data is loaded, and a bus for inputting/outputting at least one piece of data to the processor and the memory. Further, the controller **222** may include, in software, a predetermined program routine or program data which is loaded to the memory from a predetermined recording medium to perform a function defined in the electronic device and operation-processed by the processor.

According to various embodiments of the present disclosure, the display unit **224** may display data (for example, event information) received from the electronic device **210**. The event information may be information transmitted by the electronic device **210** according to event generation and may include information for temporary notification of text or images or information that requires successive operations in the form of animation.

According to various embodiments of the present disclosure, the display unit **224** of the cover **220** may use a storable reflective display having no power consumption on a stopped screen and may be configured in the form of, for example, at least one of E-ink, Electrophoretic Display (EPD), and cholesteric LCD.

According to various embodiments, when the display unit **224** of the cover **220** can be driven with low power or sufficient power is supplied to the display unit **224**, the display unit **224** may be configured by one or more of a Liquid Crystal Display (LCD), a Thin Film transistor LCD (TFT-LCD), an Organic Light Emitting Diode (OLED), LED, Active Matrix OLED (AMOLED), a flexible display, and a 3 dimensional display. Some of the displays may be implemented in a transparent type or a light transmission type so that the outside can be seen therethrough. The display may be implemented in a transparent display form including Transparent OLED (TOLED).

Referring to FIG. **2**, the second external device (for example, the NFC device **230**) may include an NFC antenna **231** and a tag chip (IC) **232** for NFC. When the second external device is found in a standby mode state of the electronic device **210** and is connected to the electronic device **210** through NFC, the second external device may transmit card information to the electronic device **210** that is driven and serves as a reader.

FIG. **3** illustrates an example of a configuration of an electronic device according to various embodiments of the present disclosure.

Referring to FIG. **3**, a cover **320** (for example, the cover **220** of FIG. **2**) may be connected to an electronic device **310** (for example, the electronic device **101** of FIG. **1** or the electronic device **210** of FIG. **2**) to cover a screen of a display unit **311** (for example, the display **160** of FIG. **1** or the display unit **215** of FIG. **1**) disposed on a first surface of the housing of the electronic device **310** according to various embodiments of the present disclosure. The cover **320** may have a display unit **321** (for example, the display unit **224** of FIG. **2**) disposed on a back surface that covers a screen area of the display unit **311** of the electronic device **310**, and a short range communication module **322** (for example, the communication unit **221** of FIG. **2**) for a connection of short range communication (for example, NFC) may be disposed in one area of a second surface of the electronic device **310**.

FIG. **4** illustrates an example of a configuration of an electronic device according to various embodiments of the present disclosure.

Referring to FIG. **4**, a cover **410** (for example, the cover **220** of FIG. **2** or the cover **320** of FIG. **3**) according to various embodiments of the present disclosure may be connected to cover the back surface of the housing of the electronic device (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**). The cover **410** may include a display unit **411** (for example, the display unit **224** of FIG. **2**) mounted on cover members **412** or **413**. Further, the cover **410** may include an NFC module **424** (or a communication unit of the cover) disposed on the surface connected to the electronic device. For example, in order to increase efficiency of received power, the cover **410** may allow at least one NFC antenna included in the NFC module **424** to arrange according to an NFC antenna pattern of the electronic device.

The cover according to the various embodiments of the present disclosure as described above may be configured in various forms as well as the form of the cover **320** of FIG. **3** or the cover **410** of FIG. **4**.

FIG. **5** illustrates an example of a configuration of an electronic device according to various embodiments of the present disclosure.

Referring to FIG. **5**, according to various embodiments of the present disclosure, when a controller **510** (for example, the processor **120** of FIG. **1** or the controller **211** of FIG. **2**) activates short range wireless communication, an electronic device **500** (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**) may transmit a control signal to a short range wireless communication module **520** (for example, the communication unit **212** of FIG. **2**). Accordingly, the short range wireless communication module **520** (for example, the short range wireless communication module **212***b* of FIG. **2**) may access an NFC antenna **531** (NFC loop coil) included in an antenna module **530** (for example, the antenna module **212***a* of FIG. **2**) and activate NFC. Further, the electronic device may release a connection of an antenna **533** (wireless power loop coil) for wireless charging with a wireless charging module **540** or block communication for wireless charging. The NFC antenna **531** and the antenna **533** for wireless charging may be disposed in adjacent areas to each other and, accordingly, interference may be generated therebetween. Further, referring to FIG. **12**, the antenna module **530** may include at least one other antenna **535** used in another communication scheme or another mode (for example, an NFC payment mode) in an area adjacent to the NFC antenna **531** and the antenna **533** for wireless charging.

FIG. **6** illustrates an example of an antenna configuration of a cover connected to an electronic device according to various embodiments of the present disclosure.

Referring to FIG. **6**, according to various embodiments of the present disclosure, a cover **620** (for example, the cover **220** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) may be mounted to an electronic device **610** (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, the electronic device **310** of FIG. **3**, or the electronic device **500** of FIG. **5**). When the cover **620** is mounted to the electronic device **610**, an antenna **621** (for

example, the antenna module **221***a* of FIG. **2**) for NFC of the cover **620** may be connected to an antenna module **611** (for example, the antenna module **212***a* of FIG. **2**). The antenna **621** of the cover **620** may be arranged on the cover **620** for an access according to an antenna pattern of the antenna **611***a* of the antenna module **611** of the electronic device **610**. According to various embodiments, the cover **620** may further include at least one antenna for supplying auxiliary power as well as the antenna **621** used for a cover mode operation. The number and sizes of antennas arranged on the cover **620** may vary depending on power supplied to the cover **620**. According to various embodiments, when the cover **620** includes a plurality of antennas, among the included antennas, the antenna **621** arranged according to the antenna pattern on the electronic device may be activated and the remaining antennas may be deactivated.

FIG. **7** illustrates an example of an antenna configuration of a cover connected to an electronic device according to various embodiments of the present disclosure.

According to various embodiments of the present disclosure, a cover **701**, **703**, or **705** (for example, the cover **220** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) may include at least one antenna **711**, **713**, or **715** arranged at various locations and forms in a particular area (for example, a central area, an upper area, or an edge line) according to a type of each electronic device. At least one antenna **711**, **713**, or **715** of the cover **701**, **703**, or **705** may be configured in a spiral, meander line, or sing loop form and a multi-antenna pad type. The multi-antenna pad may be configured separately and used for various types of covers and electronic devices. Further, the cover according to various embodiments of the present disclosure may include an antenna arranged in various forms as well as the aforementioned forms illustrated in FIG. **7**.

An electronic device according to one of various embodiments of the present disclosure may include a communication unit for communicating with a cover connected to the electronic device through short range wireless communication, and a controller. The controller may determine generation of an event related to the cover, supplies power to the cover through wireless communication when the event is generated, make a control to transmit event information to the cover through the short range wireless communication to display the information related to the generated event on the cover when the cover is driven by the supplied power, and switch to a standby mode after releasing a communication connection with the cover when an operation of the cover according to the event is completed.

According to various embodiments of the present disclosure, the controller may not recognize another external device while the event information is transmitted to the cover.

According to various embodiments of the present disclosure, the controller may search for the cover during a time interval of an N search period corresponding to the cover and, when the time interval corresponding to the cover passes, search for another external device corresponding to another time interval of the search period.

According to various embodiments of the present disclosure, the controller may transmit the information related to the event to the cover for the time interval corresponding to the cover and, when the time interval corresponding to the cover set in accordance with the cover passes and the other time interval is selected, determine that the operation of the cover is completed.

According to various embodiments of the present disclosure, even when the connection of the short range wireless communication with the cover is released, the controller may maintain an operation for supplying the power to the cover for a preset time by using a routine different from a routine for connecting the short range wireless communication.

According to various embodiments of the present disclosure, the controller may calculate an operation time of the cover by analyzing the information related to the event and, when the calculated operation time passes, determine that the operation of the cover is completed.

According to various embodiments of the present disclosure, when a tag signal including information indicating the completion of the operation is received from the cover, the controller may determine that the operation of the cover is completed.

According to various embodiments of the present disclosure, when the electronic device releases the connection of the short range wireless communication with the cover, switches to the standby mode, and performs an operation in the standby mode, if another external device is not recognized, the controller may maintain an operation for supplying the power to the cover for a preset standby time.

According to various embodiments of the present disclosure, when the cover is driven, the controller may receive authentication information of the cover, perform an authentication, and then perform an operation for the connection of the short range wireless communication with the cover.

An accessory device (for example, the cover **220** of FIG. **2**) according to one of various embodiments of the present disclosure may include a housing including a first surface and a second surface facing an opposite side to the first surface, a connecting structure connected to the housing and making the second surface attachable to/detachable from one surface of an external electronic device, a display formed on at least a part of the first surface, and a control circuit disposed inside the housing and electrically connected to the display, wherein the control circuit may include a conductive pattern arranged inside the housing near the second surface of the housing to receive a magnetic flux generated from the one surface of the external electronic device and/or a transmitted signal, a power storage device that at least temporarily stores power induced by the magnetic flux; and a memory device that temporarily stores at least a part of information included in the transmitted signal, and at least a part of the display may be activated using at least the part of the information and the power.

According to various embodiments of the present disclosure, the memory device may pre-store data on at least one of an image, text, and a figure pattern to be displayed at least the part of the display, and the control circuit may select at least a part of the data at least partially based on at least the part of the information included in the transmitted signal and activate at least the part of the display by using at least the selected part of the data.

A device (for example, the cover **220** of FIG. **2**) according to one of various embodiments of the present disclosure may include a housing including a first surface facing a first direction and a second surface facing a second direction opposite to the first direction, a connecting structure that makes the housing attachable to/detachable from a back surface of an external device to allow the second surface to face the back surface of the external device, a short range communication circuit that receives wireless power and at least one signal from the external device through the back surface of the external device, the short range communication circuit being located inside the housing, a control circuit located inside the housing and electrically connected to the

short range communication circuit, and at least one display element exposed to the first surface of the housing, wherein the display element may include a container, liquid within the container, and a plurality of particles distributed in the liquid, and the control circuit may move at least some of the plurality of particles existing in at least one of text and an image to the first surface in response to the at least one signal from the external device.

An operation procedure for short range wireless communication in the above described electronic device will be described in detail with reference to the accompanying drawings.

FIG. **8** illustrates an example of an operation procedure of an electronic device according to various embodiments of the present disclosure.

Referring to FIG. **8**, according to various embodiments of the present disclosure, in operation **801**, the electronic device (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**) may identify whether the cover (for example, the electronic device **102** or **104** of FIG. **1**, the electronic device **210** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) is connected to the housing, recognize a cover connected state, and perform a setting operation according to the coupling of the cover. When it is identified that the cover is connected based on a result of the identification of operation **801**, the electronic device may perform operation **803**.

In operation **803**, the electronic device may perform a standby mode operation. The standby mode operation may include at least one of an operation of periodically searching for a short range wireless communication signal (for example, an NFC signal) and an operation of identifying whether an event (for example, an event of the cover) is generated. The electronic device may identify an event set to transmit/receive data to/from the cover in a standby mode state through a short range wireless communication connection. The electronic device may perform a wireless signal operation (for example, NFC signal search) in the standby mode state.

The electronic device may identify whether an event of the cover is generated in operation **805**. When the event of the cover is not generated, the electronic device may proceed to operation **803** and perform the standby mode operation.

When the event of the cover is generated based on a result of the identification of operation **805**, the electronic device performs operation **807**.

In operation **807**, the electronic device may transmit a wireless power signal to the cover and, when the cover receiving power is driven by the transmitted wireless power signal, perform a short range wireless communication connection with the cover. Further, the electronic device may authenticate the cover by using authentication information (for example, identification information) received from the cover when the short range wireless communication connection with the cover is performed.

When the electronic device is connected to the cover through the short range wireless communication, the electronic device may transmit information on the generated event (hereinafter, referred to as event information) to the cover through the short range wireless communication in operation **809**.

In operation **811**, the electronic device may identify whether event information is completely displayed on the cover. According to various embodiments, the electronic device may use a tag signal and, when a tag signal includes information indicating that the event information is completely displayed as the event information is completely displayed on the cover, may identify that the operation of the cover is completed, that is, the event information is completely displayed. According to various embodiments, the electronic device may transmit the event information to the cover and, when a predetermined time passes, determine that the operation of the cover is completed based on the event information. The completion of the operation of the cover may be identified according to various embodiments in addition to the above embodiments.

When the operation of the cover is not completed based on a result of the identification of operation **811**, the electronic device may continuously identify whether the operation of the cover is completed. When the operation of the cover is completed, the electronic device may perform operation **813**.

In operation **813**, as the operation of the cover is completed, the electronic device may release the NFC connection with the cover, switch to the standby mode, and then perform operation **803** again.

Next, an operation procedure of the cover that performs short range communication with the electronic device through the operation procedure illustrated in FIG. **8** will be described with reference to the drawings.

FIG. **9** illustrates an example of an operation procedure of the cover according to various embodiments of the present disclosure.

Referring to FIG. **9**, when an event is generated in a state where the cover (for example, the electronic device **102** or **104** of FIG. **1**, the electronic device **210** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) is connected to the electronic device (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**), the cover may receive power from the electronic device through NFC in operation **901**. According to various embodiments, when the cover receives a power signal from the electronic device, an induced current is generated in an NFC antenna and the cover may receive power and, when power is supplied for a predetermined time, power is applied to internal modules and the internal modules may be driven.

When power is supplied and thus the cover initiates the operation, the cover may transmit information for performing an authentication to the electronic device and transmit/receive information related to the authentication to perform the authentication of the cover in operation **903**.

When the authentication is completed and an NFC connection procedure for transmitting/receiving data is completed, the cover may receive event information from the electronic device and store the received event information in a memory in operation **905**.

In operation **907**, the cover may display the received event information.

In operation **909**, the cover may identify whether the operation for displaying the event information is completed. When the operation is not completed based on a result of the identification, the cover may continuously perform operation **907**. When the operation is completed, the cover may perform operation **911**. According to various embodiments, the cover may identify control information received together with the event information from the electronic device, display the event information for a predetermined time included in the control information, and complete the operation. According to various embodiments, when the previously displayed information such as an electronic ink display (EPD) is maintained, the cover may identify that the operation is completed as an update to the received event

information is completed. According to various embodiments, the cover may identify that the operation is completed after a last frame among frames of the received event information is displayed or a predetermined time passes after the last frame is displayed.

In operation **911**, the cover may identify that the operation is completed and transmit a signal that notifies the completion of the operation to the electronic device. According to various embodiments, the cover may insert information indicating the completion of the operation into a tag signal and transmit the tag signal to the electronic device. According to various embodiments, the cover may transmit a separate signal that notifies of the completion of the operation through NFC. According to various embodiments, when cover completes the operation control information received from the electronic device, the cover may not perform operation **911** or may transmit a response signal corresponding to the control information.

In operation **913**, the NFC connection may be released as the cover identifies the completion of the operation. According to various embodiments, the cover may maintain the supply of wireless power even though the NFC connection is released. According to various embodiments, the cover may supply power to the display for a predetermined time even through the wireless power signal is not received from the electronic device as the NFC connection is released. According to various embodiments, the cover may release the NFC connection of the main antenna and receive power for performing the operation through the sub antenna.

After operation **913**, the cover may complete the operation for performing a predetermined function such as a display operation and turn off the device as the NFC connection is released.

An operation procedure of the electronic device will be described when the coupling of the cover to the electronic device is recognized after driving of the electronic device is initiated (woken up) before the operation procedures of the electronic device and the cover described above are performed.

FIG. **10** illustrates an operation process of the electronic device according to various embodiments of the present disclosure.

Referring to FIG. **10**, when the cover (the electronic device **102** of FIG. **1**, the cover **220** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) may be connected to the housing of the electronic device (for example the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**), power is supplied, and driving of the electronic device is initiated (woken up), the electronic device may recognize the connected cover in operation **1001**. According to various embodiments, as the electronic device detects an NFC signal generated by the connected cover, the electronic device may recognize the cover. According to various embodiments, the electronic device may recognize the coupling of the cover through a sensor included in the electronic device. According to various embodiments, when a connector of the housing is electrically connected to a connector of the cover, the electronic device may recognize the coupling of the cover.

In operation **1003**, when the electronic device identifies the coupling state of the cover, the electronic device may connect NFC with the cover. According to various embodiments, when an NFC polling scheme is used, the electronic device may search for the cover in a predetermined time interval of the polling period and recognize the cover. When the cover is recognized, the electronic device may transmit a wireless power signal and connect NFC with the cover as the cover is driven.

When the NFC is connected, the electronic device may serve as a reader and read cover information from the cover in operation **1005**. In operation **1007**, the electronic device may set a cover operation by using the read cover information. The setting of the cover operation may include an execution of a corresponding application and a setting of at least one of notification information, an operation time, and an operation method through the executed application.

In operation **1009**, the electronic device may transmit setting information according to a dynamic setting to the cover and identify the operation of the cover.

After the electronic device identifies the operation of the cover or a predetermined time passes, the electronic device may release NFC in operation **1011** and switch to the standby mode in operation **1013**. For an NFC connection with another NFC device regardless of the cover in the state where the electronic device is connected to the cover, the electronic device may release the NFC connection with the electronic device and search for an NFC signal.

As described above, when the electronic device switches to the standby mode and an event of the cover is generated in a state where the standby mode state is maintained in operation **1011**, the electronic device may perform the operation procedure as illustrated in FIG. **8**.

A detailed operation procedure of a method for short range wireless communication will be described according to the operation procedure of the electronic device described in FIG. **8**, **9**, or **10** with reference to the accompanying drawings.

FIG. **11** illustrates an operation procedure of the electronic device according to various embodiments of the present disclosure.

Referring to FIG. **11**, the electronic device (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**) according to various embodiments of the present disclosure may perform a standby mode operation in a state where the electronic device is connected to the cover (for example, the cover **220** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) in operation **1101**. The electronic device may periodically perform an NFC signal search operation in the standby mode state. According to various embodiments, the electronic device may periodically search for an NFC signal by applying an NFC polling scheme.

In operation **1103**, the electronic device may identify whether an event (for example, an event of the cover) is generated in the standby mode. When the event is not generated in the cover based on a result of the identification, the electronic device may perform operation **1119**. When the event is generated in the cover based on the result of the identification, the electronic device may perform operation **1105**.

In operation **1105**, the electronic device switches to a cover operation mode in the standby mode state and stop the NFC signal search operation.

In operation **1107**, the electronic device may transmit a wireless power signal to the cover and identify whether the cover having received power is driven by the transmitted wireless power signal.

In operation **1109**, when the electronic device identifies driving of the cover, the electronic device may perform a procedure for an NFC connection. When the electronic device performs NFC connection with the cover, the electronic device may perform a cover authentication based on

authentication information (for example, identification information) received from the cover in operation **1111**.

When the NFC is connected between the electronic device and the cover, the electronic device may transmit information related to the generated event (hereinafter, referred to as event information) to the cover through the NFC in operation **1113**.

In operation **1115**, the electronic device may identify whether an operation for displaying the event information on the cover is completed. According to various embodiments, the electronic device may use a tag signal and, when a tag signal includes information indicating that the event information is completely displayed as the event information is completely displayed on the cover, may identify that the operation of the cover is completed, that is, the event information is completely displayed. According to various embodiments, the electronic device may transmit the event information to the cover and, when a predetermined time passes, determine that the operation of the cover is completed based on the event information. The completion of the operation of the cover may be identified according to various embodiments in addition to the above embodiments.

When the operation of the cover is not completed based on a result of the identification of operation **1115**, the electronic device may continuously identify whether the operation of the cover is completed. When the operation of the cover is completed, the electronic device may perform operation **1117**.

In operation **1117**, as the operation of the cover is completed, the electronic device may release the NFC connection with the cover, switch to the standby mode, and then perform operation **1101** again.

In operation **1119**, the electronic device may identify whether another NFC device is recognized in the standby mode state. When the other NFC device is not identified based on a result of the identification, the electronic device may continuously perform the standby mode operation in operation **1101**. When the other NFC device is recognized based on the result of the identification, the electronic device may connect NFC with the other recognized NFC device in operation **1121**.

When a predetermined time passes or the particular operation is completed, the electronic device may release the NFC connection with the other NFC device in operation **1123**, switch to the standby mode, and periodically perform the NFC signal search operation again in operation **1101**.

FIG. **12** illustrates an example of an operation of the electronic device in a standby mode according to various embodiments of the present disclosure.

According to various embodiments of the present disclosure, when performing operation **1101** of FIG. **11**, the electronic device may periodically search for the NFC signal by applying the NFC polling scheme.

Referring to FIG. **12**, the electronic device may serve as a reader, divide a time interval of a search period (for example, an NFC polling period) according to each of NFC types, and search for an external device (an NFC device) corresponding to the corresponding NFC type in the set time interval. According to various embodiments, the polling period may be largely divided into an NFC passive communication interval **1201** and an NFC active communication interval **1203**, and the NFC active communication interval **1203** may include divided slots according to an external device existing outside. A slot **1205** (for example, a second NFC active type time interval) may be set in the NFC active communication interval **1203** and, accordingly, the electronic device may search for the cover for a preset time in accordance with the cover. The NFC passive communication interval **1201** is an interval in which data is transmitted in a load modulation scheme through an electromagnetic field provided by a reader (not shown). Further, the NFC active communication interval **1203** is an interval in which the terminal directly generates a magnetic field and transmits data carried on the corresponding magnetic field, and may use a scheme for selecting the corresponding slot according to an NFC device existing outside.

FIG. **13** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure.

Referring to FIG. **13**, in operation **1301**, the electronic device (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**) may identify whether a module for NFC is in an on state (NFC is turned on).

When an NFC function is executed, the electronic device may identify whether the cover (for example, the cover **220** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) is recognized through coupling of the cover to the electronic device or whether an event related to the cover is generated in a state where the cover is connected in operation **1303**.

When the cover is not connected or the event is not generated in the state where the cover is connected based on a result of the identification of operation **1303**, the electronic device may perform operation **1303** again. According to various embodiments, when the event is not generated in the state where the cover is connected, the electronic device may identify an approach of another NFC device and, when the other NFC device approaches, connect NFC with the other NFC device.

When the cover is connected or the event is generated in the state where the cover is connected based on the result of the identification of operation **1303**, the electronic device may perform operation **1305**.

In operation **1305**, the electronic device may supply power by transmitting a wireless power signal to the cover through an NFC scheme. At this time, the electronic device is in a state where the NFC is not connected with the cover and may perform an NFC connection with another NFC device for a predetermined time according to the approach of the other NFC device. Accordingly, in operation **1307**, the electronic device may identify the elapse of a preset standby time. That is, the electronic device may identify that the preset standby time passes after the cover receives power and thus is driven (power is turned on). The electronic device may continuously perform operation **1307** when the preset standby time does not pass based on a result of the identification, and perform operation **1309** when the preset standby time passes. At this time, according to various embodiments, the electronic device may identify whether another NFC device approaches before receiving a response signal in a state where a predetermined time does not pass. For example, when the NFC is connected with the cover through the coupling of the cover to the electronic device, the electronic device may communicate with an NFC device for payment, that is, another NFC device for a preset standby time as the NFC device approaches and the NFC with the cover may wait for the preset standby time or be ignored, so that the electronic device may perform NFC with the cover after the preset standby time passes. In operation **1309**, the electronic device may identify whether a response signal is received from the cover. The cover may wait for a preset standby time after power is turned on and then respond. Accordingly, even though the cover is connected or the

event is generated, the electronic device may connect the NFC after a predetermined time instead of immediately connecting the NFC with the cover and search for another NFC device.

When the response signal is not received based on a result of the identification of operation **1309**, the electronic device may stop supplying power to the cover in operation **1315**.

When the response signal is received based on the result of the identification of operation **1309**, the electronic device may perform operation **1311**.

In operation **1311**, the electronic device may identify driving of the cover and perform an NFC connection procedure with the cover.

When the NFC is connected with the cover, the electronic device may transmit event information to the cover and identify whether an operation according to the event information is completed in operation **1313**.

When the operation of the cover is completed or after a predetermined time passes, the electronic device may release the NFC connection (turn off NFC) and terminate the operation in operation **1315**.

According to various embodiments, for example, when the NFC module maintains an off state and then periodically wakes up (on) when an event is generated or in order to search for NFC, the electronic device may perform the operation procedure of FIG. **13**.

Hereinafter, a method of performing NFC in consideration of a case where a wireless charging operation is performed based on the operation of the electronic device according to various embodiments of the present disclosure described in FIGS. **8** to **13** will be described.

FIG. **14** illustrates an example of an operation procedure of the electronic device according to various embodiments of the present disclosure.

Referring to FIG. **14**, according to various embodiments of the present disclosure, in operation **1401**, the electronic device (for example, the electronic device **101** of FIG. **1**, the electronic device **210** of FIG. **2**, or the electronic device **310** of FIG. **3**) may activate a wireless charging operation and supply wireless power supplied through an antenna for wireless charging to a battery. In the wireless charging operation, the electronic device may identify whether the cover (for example, the cover **220** of FIG. **2**, the cover **320** of FIG. **3**, or the cover **410** of FIG. **4**) is connected to the housing.

The electronic device may recognize a coupling state of the cover, and perform a setting operation according to the coupling of the cover or identify a set event to transmit/receive data through an NFC with the cover in a standby mode state. The electronic device may perform an NFC signal search operation in the standby mode state. Accordingly, the electronic device is currently in a state where the cover is connected and may perform a standby mode operation in the standby mode state in operation **1403**. The standby mode operation may include at least one of an operation of periodically searching for an NFC signal and an operation of identifying whether an event (for example, an event of the cover) is generated.

The electronic device may identify whether the event is generated in the cover in operation **1405**. When the event is not generated in the cover, the electronic device may continuously perform the wireless charging operation in operation **1401** and maintain the standby mode state.

When the event of the cover is generated based on the result of the identification of operation **1405**, the electronic device performs operation **1407**.

In operation **1407**, when transmitting a wireless power signal to the cover, the electronic device may deactivate the wireless charging operation in order to prevent interference by wireless charging. Further, the electronic device may connect NFC with the cover and supply power to the cover. When performing the NFC connection with the cover, the electronic device may perform a cover authentication based on authentication information (for example, identification information) received from the cover.

In operation **1409**, as the electronic device connects the NFC with the cover, the electronic device may transmit a wireless signal including event information on the generated event to the cover through the NFC.

In operation **1411**, the electronic device may identify whether event information is completely displayed on the cover. According to various embodiments, the electronic device may use a tag signal and, when a tag signal includes information indicating that the event information is completely displayed as the event information is completely displayed on the cover, may identify that the operation of the cover is completed, that is, the event information is completely displayed. According to various embodiments, the electronic device may transmit the event information to the cover and, when a predetermined time passes, determine that the operation of the cover is completed based on the event information. The completion of the operation of the cover may be identified according to various embodiments in addition to the above embodiments.

When the operation of the cover is completed based on a result of the identification of operation **1411**, the electronic device may continuously identify whether the operation of the cover is completed and, when the operation of the cover is completed, may perform operation **1413**.

In operation **1413**, as the operation of the cover is completed, the electronic device may release the NFC connection with the cover, switch to the standby mode, and then perform operation **1401** again.

According to various embodiments of the present disclosure, when electronic device may not perform operations **1411** and **1413** and completely transmits the event information, the electronic device activates the wireless charging operation again in operation **1401**.

According to various embodiments of the present disclosure, the electronic device may perform the cover mode operation through NFC identically to the operation procedure of FIG. **14**, but may not deactivate the wireless charging operation and may lower wireless charging transmission power (Tx power) in operation **1407** when switching to the cover mode or the event is generated. Further, when the operation is completed, the electronic device may not release the NFC, and may increase transmission power for wireless charging and perform the wireless charging operation in operation **1401** in a state where the NFC connection is maintained.

A method of short range wireless communication in an electronic device according to one of various embodiments of the present disclosure may include an operation of, when a cover is connected to the electronic device, determining generation of an event related to the cover, an operation of, when the event is generated, an operation of supplying power to the cover through wireless communication, an operation of, when the cover is driven by the supplied power, transmitting event information to the cover through the short range wireless communication to display the information related to the generated event on the cover, and an operation of, when an operation of the cover according to

the event is completed, switching to a standby mode after releasing a short range wireless communication connection with the cover.

According to various embodiments of the present disclosure, the operation of transmitting the event information to the cover may include an operation of not recognizing another external device while the event information is transmitted to the cover.

According to various embodiments of the present disclosure, an operation in the standby mode may include an operation for searching for the cover during a time interval of a search period corresponding to the cover and, when the time interval corresponding to the cover passes, searching for another external device corresponding to another time interval of the search period.

According to various embodiments of the present disclosure, the operation of switching to the standby mode may include an operation of transmitting the information related to the event to the cover for the time interval of a search period corresponding to the cover, an operation of, when the time interval corresponding to the cover set in accordance with the cover passes and the other time interval is selected, determining that the operation of the cover is completed, and an operation of switching to the standby mode as the operation of the cover is completed.

According to various embodiments of the present disclosure, the operation of switching to the standby mode may include an operation of, even when the connection of the short range wireless communication with the cover is released, maintaining the power supplied to the cover for a preset time by using a routine different from a routine for connecting the short range wireless communication.

According to various embodiments of the present disclosure, the operation of switching to the standby mode may include an operation of calculating an operation time of the cover by analyzing the information related to the event, an operation of, when the calculated operation time passes, determining that the operation of the cover is completed, and an operation of switching to the standby mode as the operation of the cover is completed.

According to various embodiments of the present disclosure, the operation of switching to the standby mode may include an operation of, when a tag signal including information indicating the completion of the operation is received from the cover, determining that the operation of the cover is completed, and an operation of switching to the standby mode as the operation of the cover is completed.

According to various embodiments of the present disclosure, the method may further include an operation of, when the electronic device releases the connection of the short range wireless communication with the cover, switches to the standby mode, and performs an operation in the standby mode, if another external device is not recognized, maintaining the power supplied to the cover for a preset standby time.

According to various embodiments of the present disclosure, the method may further include an operation of, when the cover is driven, receiving authentication information of the cover and performing an authentication.

FIG. **15** illustrates an example of a configuration of an electronic device according to various embodiments.

Referring to FIG. **15**, according to various embodiments of the present disclosure, an electronic device **1510** (for example, the electronic device **101** of FIG. **1** or the electronic device **210** of FIG. **2**) may be linked with an accessory device (hereinafter, referred to as a cover **1520**) through short range wireless communication.

The electronic device **1510** may include a processor **1511**, a short range wireless communication module **1512**, and an antenna module **1513**.

The processor **1511** (for example, similar or equal to the processor **120** of FIG. **1** or the controller **211** of FIG. **2**) may include an application module **1511***a*, a framework including a short range wireless communication service management module **1511***c* (for example, an NFC service manager) and a notification management module **1511***b*, a Hardware Abstraction Layer (HAL) **1511***d*, or a kernel **1511***e*.

The application module **1511***a* (for example, the application program of FIG. **1**) may execute various applications which can be executed in the electronic device.

When an event related to the cover **1520** is generated, the notification management module **1511***b* may transmit an event message including information related to the generated event to the short range wireless communication service management module **1511***c*.

The short range wireless communication management module **1511***c* may receive the event message and convert the received event message into a frame data for short range wireless communication (for example, NFC). Further, the short range wireless communication service management module **1511***c* may enable the short range wireless communication module **1512** and transmit the converted frame data to the short range wireless communication module **1512**.

The HAL **1511***d* (for example, the API **145** of FIG. **1**) may be used like the API as a part of the operating system, and may be a set of routines independent details of hardware used for implementing an input/output interface, interrupt control, and multi-processor communication.

The kernel **1511***e* (for example, the kernel **141** of FIG. **1**) may control or manage system resources (for example, the processor **1511**, the short range wireless communication module **1512**, and/or the antenna module **1513**) used for executing an operation or a function implemented in, for example, different programs (for example, applications executed by the application module **1511***a*). Further, the kernel **1511***e* may perform at least one of controlling, allocating, and collecting the system resources.

The short range wireless communication module **1512** (for example, similar or equal to the short range wireless communication module **212***b* of FIG. **2**) may include firmware **1512***a*. The short range wireless communication module **1512** may generate a wireless signal (an RF field or magnetic flux) in the cover **1520** through the antenna module **1513** to be connected to the cover **1520** in a magnetic induction type, and activate the antenna module **1521** of the cover **1520** by the generated wireless signal. Further, the short range wireless communication module **1512** may transmit received short range wireless communication frame data to the cover **1520** through the antenna module **1513**. The antenna module **1513** (for example, similar or equal to the antenna module **212***a* of FIG. **2**) may be combined with the antenna module **1521** of the cover **1520** in a magnetic induction type (magnetic induction scheme) for wireless charging of the cover **1520** and also perform the wireless charging of the cover **1520** through, for example, a magnetic resonance scheme or an electromagnetic wave scheme. Further, the antenna module **1513** may include an additional circuit for wireless charging, for example, a coil loop, a resonant circuit, or a rectifier.

According to various embodiments of the present disclosure, the cover **1520** (for example, similar or equal to the cover **220** of FIG. **2**) may include the antenna module **1521**,

a short range wireless communication module **1522**, a control module **1523**, a display module **1524**, a memory **1525**, or a regulator **1526**.

The antenna module **1521** (for example, similar or equal to the antenna module **221***a* of FIG. **2**) may be combined with the electronic device **1510** by the wireless signal (or magnetic field) generated by the antenna module **1513** of the electronic device **1510** in, for example, a magnetic induction type.

The short range wireless communication module **1522** (for example, similar or equal to the short range wireless communication module **221***b* of FIG. **2**) may store short range wireless communication frame data received from the electronic device **1510** through the antenna module **1521** in the memory **1525**.

The control module **1523** (for example, similar or equal to the controller **222** of FIG. **2**) may read the short range wireless communication frame data stored in the memory **1525** and transmit the read short range wireless communication frame data to the display module **1524**.

The display module **1524** (for example, similar or equal to the display unit **224** of FIG. **2**) may include a driver **1524***a* and a display panel **1524***b* (for example, an ElectroPhoretic Display (EPD)). The driver **1524***a* may make a control to display the transmitted frame data by controlling a voltage applied to the display panel **1524***b*.

The memory **1525** may store the frame data received from the electronic device **1510**. Further, the memory **1525** may store a program or data used for a function operation of the cover **1520** according to various embodiments. The memory **1525** may largely include a program area and a data area. The program area may store relevant information for driving of the cover **1520** such as an Operating System (OS) that boots the electronic device. The data area may store transmitted/received data or generated data according to various embodiments. Further, the memory **1525** may include at least one storage medium of a flash memory, a hard disk, a multimedia card micro type memory (for example, an SD or XD memory), a RAM, and a ROM.

The regulator **1526** may output a voltage applied by the magnetic field generated in the electronic device **1510** to be a voltage suitable for each module.

Referring back to FIG. **15**, when an event is generated, the notification management module **1511***b* may generate an event message and transmit the generated event message to the short range wireless communication service management module **1511***c* in operation **1501**. Accordingly, in operation **1503**, the short range wireless communication service management module **1511***c* may convert the received event message into, for example, an NFC type data format and transmit the converted NFC frame data to the short range wireless communication module **1512**.

When the short range wireless communication module **1512** of the cover **1520** receives the NFC frame data, the short range wireless communication module **1512** may transmit the received NFC frame data to the cover **1520** through the antenna module **1513** in operation **1505**. In operation **1505**, the short range wireless communication module **1522** included in the cover **1520** may store the NFC frame data received through the antenna module **1521** in the memory **1525**.

In operation **1507**, the control module **1523** of the cover **1520** may read display information included in the frame data stored in the memory **1525**, transmit the display information to the display module **1524**, and display the display information on the display panel **1524***b* (for example, EPD).

FIG. **16** illustrates an example of a memory map according to various embodiments of the present disclosure.

The memory **1525** of the cover **1520** illustrated in FIG. **15** may store the short range wireless communication frame data received from the electronic device. A memory map for storing the received short range wireless communication frame data may include control information **1601** containing information related to a state of a control module, updated date/time information, or information on a frame sequence, and display information **1603** as illustrated in FIG. **16**. The display information **1603** may be information related to the electronic device and the generated event and may include information which can be displayed on the display of the cover.

FIG. **17** illustrates an operation procedure of an electronic device according to various embodiments of the present disclosure, and FIG. **18** illustrates an example of a program related to short range wireless communication of the electronic device according to various embodiments of the present disclosure.

Referring to FIG. **17**, according to various embodiments of the present disclosure, an electronic device **1701** (for example, the electronic device **1510** of FIG. **15**) may identify whether an event related to a cover **1703** is generated in operation **1711**. The electronic device may perform operation **1713** when the event is generated based on a result of the identification, and perform operation **1711** again when the event is not generated.

In operation **1713**, the electronic device **1701** may start short range wireless communication (for example, NFC). The electronic device **1701** may start short range wireless communication through a program illustrated in FIG. **18**.

In operation **1715**, the electronic device **1701** may activate the short range wireless communication module (for example, the short range wireless communication module **1512** of FIG. **15**) and generate a wireless signal (RF field) (for example, magnetic flux) for wireless charging of the cover **1703**.

In operation **1717**, the electronic device **1701** may transmit the generated wireless signal to the cover **1703**.

In operation **1719**, the cover **1703** may perform wireless charging by the received wireless signal and activate the short range wireless communication module by applying wirelessly charged power to the short range wireless communication module (for example, the short range wireless communication module **1522** of FIG. **15**). Accordingly, the cover **1703** may be combined with the electronic device in, for example, a magnetic induction type.

In operation **1721**, the electronic device **1701** may transmit an initial command message to the cover **1703**. The initial command message may include information (REQ_PROTOCOL_S) that makes a request for a protocol for communication with the cover **1703**.

In operation **1723**, the electronic device **1701** may receive a response message (ACK_RPOTOCOL_S) according to the protocol request from the cover **1703**.

In operation **1725**, the electronic device **1701** may transmit a data transfer message including event information according to the generation of the event to the cover **1703** by using the received protocol. The event information may be the display information illustrated in FIG. **16** and may be stored in the memory. Accordingly, the cover **1703** may display the received event information on the display.

In operation **1727**, the electronic device **1701** may identify whether the display information is completely transmitted. The electronic device **1701** may perform operation **1729** when the event information is completely transmitted based

on a result of the identification, and continuously perform operation **1725** when the event information is not completely transmitted.

In operation **1729**, the electronic device **1701** may transmit an end command message (EXID_PROTOCOL_S) to the cover **1703**.

In operation **1731**, the electronic device **1701** may receive a response message (ACK_EXIT_PROTOCOL_S) corresponding to the end command, and end the NFC for transmitting the event information according to the generation of the event as the response message corresponding to the end command is received.

FIG. **19** illustrates a block diagram of an electronic device according to various embodiments.

Referring to FIG. **19**, an electronic device **1901** may include, for example, the entirety or a part of the electronic device **101** illustrated in FIG. **1**. The electronic device **1901** may include at least one Application Processor (AP) **1910**, a communication module **1920**, a Subscriber Identification Module (SIM) **1924**, a memory **1930**, a sensor module **1940**, an input device **1950**, a display **1960**, an interface **1970**, an audio module **1980**, a camera module **1991**, a power management module **1995**, a battery **1996**, an indicator **1997**, and a motor **1998**.

The processor **1910** may control a plurality of hardware or software elements connected to the processor **1910** and may perform various data processing and operations by driving an operating system or an application program. The processor **1910** may be embodied, for example, as a System on Chip (SoC). According to an embodiment, the processor **1910** may further include a Graphic Processing Unit (GPU) and/or an image signal processor. The processor **1910** may also include at least some (for example, a cellular module **1921**) of the elements illustrated in FIG. **19**. The processor **1910** may load, in a volatile memory, instructions or data received from at least one of the other elements (for example, a non-volatile memory) to process the loaded instructions or data, and may store various types of data in the non-volatile memory.

The communication module **1920** may have a configuration equal or similar to that of the communication interface **170** of FIG. **1**. The communication module **1920** may include, for example, a cellular module **1921**, a Wi-Fi module **1923**, a BT module **1925**, a GNSS module **1927** (for example, a GPS module, a Glonass module, a Beidou module, or a Galileo module), an NFC module **1928**, and a Radio Frequency (RF) module **1929**.

The cellular module **1921** may provide, for example, a voice call, a video call, a text message service, an Internet service, and the like through a communication network. According to an embodiment, the cellular module **1921** may identify and authenticate the electronic device **1901** within a communication network using the subscriber identification module **1924** (for example, a SIM card). According to an embodiment, the cellular module **1921** may perform at least some of the functions that the processor **1910** may provide. According to an embodiment, the cellular module **1921** may include a Communication Processor (CP).

Each of the Wi-Fi module **1923**, the BT module **1925**, the GNSS module **1927**, or the NFC module **1928** may include, for example, a processor for processing data that is transmitted and received through the corresponding module. According to some embodiments, at least some (two or more) of the cellular module **1921**, the Wi-Fi module **1923**, the BT module **1925**, the GNSS module **1927**, and the NFC module **1928** may be included in one Integrated Chip (IC) or IC package.

The RF module **1929**, for example, may transmit/receive a communication signal (for example, an RF signal). The RF module **1929** may include, for example, a transceiver, a Power Amplifier Module (PAM), a frequency filter, a Low Noise Amplifier (LNA), an antenna, and the like. According to another embodiment, at least one of the cellular module **1921**, the Wi-Fi module **1923**, the BT module **1925**, the GNSS module **1927**, and the NFC module **1928** may transmit/receive an RF signal through a separate RF module.

The subscriber identification module **1924** may include, for example, a card that includes a subscriber identity module and/or an embedded SIM, and may contain unique identification information (for example, an Integrated Circuit Card Identifier (ICCID)) or subscriber information (for example, an International Mobile Subscriber Identity (IMSI)).

The memory **1930** (for example, the memory **130**) may include, for example, an internal memory **1932** or an external memory **1934**. The internal memory **1932** may include at least one of, for example, a volatile memory (for example, a Dynamic Random Access Memory (DRAM), a Static RAM (SRAM), a Synchronous Dynamic RAM (SDRAM), and the like) and a non-volatile memory (for example, a One Time Programmable Read Only Memory (OTPROM), a Programmable ROM (PROM), an Erasable and Programmable ROM (EPROM), an Electrically Erasable and Programmable ROM (EEPROM), a mask ROM, a flash ROM, a flash memory (for example, a NAND flash memory or a NOR flash memory), a hard disc drive, a Solid State Drive (SSD), and the like).

The external memory **1934** may further include a flash drive, for example, a Compact Flash (CF), a Secure Digital (SD), a Micro Secure Digital (Micro-SD), a Mini Secure Digital (Mini-SD), an eXtreme Digital (xD), a Multi-Media Card (MMC), a memory stick, and the like. The external memory **1934** may be functionally and/or physically connected to the electronic device **1901** through various interfaces.

The sensor module **1940** may, for example, measure a physical quantity or detect the operating state of the electronic device **1901** and may convert the measured or detected information into an electrical signal. The sensor module **1940** may include, for example, at least one of a gesture sensor **1940**A, a gyro sensor **1940**B, an atmospheric pressure sensor **1940**C, a magnetic sensor **1940**D, an acceleration sensor **1940**E, a grip sensor **1940**F, a proximity sensor **1940**G, a color sensor **1940**H (for example, a red, green, blue (RGB) sensor), a biometric sensor **1940**I, a temperature/humidity sensor **1940**J, a light sensor **1940**K, and a ultraviolet (UV) sensor **1940**M. Additionally or alternatively, the sensor module **1940** may include, for example, an E-nose sensor, an electromyography (EMG) sensor, an electroencephalogram (EEG) sensor, an electrocardiogram (ECG) sensor, an Infrared (IR) sensor, an iris sensor, and/or a fingerprint sensor. The sensor module **1940** may further include a control circuit for controlling one or more sensors included therein. In some embodiments, the electronic device **1901** may further include a processor configured to control the sensor module **1940** as a part of, or separately from, the processor **1910**, and may control the sensor module **1940** while the processor **1910** is in a sleep state.

The input device **1950** may include, for example, a touch panel **1952**, a (digital) pen sensor **1954**, a key **1956**, or an ultrasonic input device **1958**. The touch panel **1952** may use, for example, at least one of a capacitive type, a resistive type, an infrared type, and an ultrasonic type. Furthermore, the touch panel **1952** may further include a control circuit.

The touch panel **1952** may further include a tactile layer to provide a tactile reaction to a user.

The (digital) pen sensor **1954** may include, for example, a recognition sheet that is a part of, or separate from, the touch panel. The key **1956** may include, for example, a physical button, an optical key, or a keypad. The ultrasonic input device **1958** may detect ultrasonic waves, which are generated by an input tool, through a microphone (for example, a microphone **1988**) to identify data corresponding to the detected ultrasonic waves.

The display **1960** (for example, the display **160**) may include a panel **1962**, a hologram device **1964** or a projector **1966**. The panel **1962** may have a configuration that is the same as, or similar to, that of the display **160** illustrated in FIG. **1**. The panel **1962** may be implemented to be, for example, flexible, transparent, or wearable. The panel **1962**, together with the touch panel **1952**, may be implemented as one module. The hologram device **1964** may show a three dimensional image in the air by using an interference of light. The projector **1966** may display an image by projecting light onto a screen. The screen may be located, for example, in the interior of, or on the exterior of, the electronic device **1901**. According to an embodiment, the display **1960** may further include a control circuit for controlling the panel **1962**, the hologram device **1964**, or the projector **1966**.

The interface **1970** may include, for example, a High-Definition Multimedia Interface (HDMI) **1972**, a Universal Serial Bus (USB) **1974**, an optical interface **1976**, or a D-subminiature (D-sub) **1978**. The interface **1970** may be included, for example, in the communication interface **170** illustrated in FIG. **1**. Additionally or alternatively, the interface **1970** may include, for example, a Mobile High-definition Link (MHL) interface, a Secure Digital (SD) card/Multi-Media Card (MMC) interface, or an Infrared Data Association (IrDA) standard interface.

The audio module **1980** may convert, for example, a sound into an electrical signal, and vice versa. At least some elements of the audio module **1980** may be included, for example, in the input/output interface **150** illustrated in FIG. **1**. The audio module **1980** may process sound information that is input or output through, for example, a speaker **1982**, a receiver **1984**, earphones **1986**, the microphone **1988**, and the like.

The camera module **1991** is a device that can photograph a still image and a moving image. According to an embodiment, the camera module **1991** may include one or more image sensors (for example, a front sensor or a rear sensor), a lens, an Image Signal Processor (ISP), or a flash (for example, an LED or xenon lamp).

The power management module **1995** may manage, for example, the power of the electronic device **1901**. According to an embodiment, the power management module **1995** may include a Power Management Integrated Circuit (PMIC), a charger Integrated Circuit (IC), or a battery or fuel gauge. The PMIC may have a wired and/or wireless charging method. Examples of the wireless charging method may include a magnetic resonance method, a magnetic induction method, an electromagnetic wave method, and the like. Additional circuits (for example, a coil loop, a resonance circuit, a rectifier, and the like) for wireless charging may be further included. The battery gauge may measure, for example, the residual amount of the battery **1996** and a voltage, current, or temperature while charging. The battery **1996** may include, for example, a rechargeable battery and/or a solar battery.

The indicator **1997** may indicate a particular state (for example, a booting state, a message state, a charging state, and the like) of the electronic device **1901** or a part (for example, the processor **1910**) thereof. The motor **1998** may convert an electrical signal into a mechanical vibration and may generate a vibration, a haptic effect, and the like. Although not illustrated, the electronic device **1901** may include a processing unit (for example, a GPU) for supporting mobile TV. The processing unit for supporting the mobile TV may process media data according to a standard, such as Digital Multimedia Broadcasting (DMB), Digital Video Broadcasting (DVB), MediaFlo™, and the like.

Each of the above-described component elements of hardware according to the present disclosure may be configured with one or more components, and the names of the corresponding component elements may vary based on the type of electronic device. The electronic device according to various embodiments of the present disclosure may include at least one of the aforementioned elements. Some elements may be omitted or other additional elements may be further included in the electronic device. Also, some of the hardware components according to various embodiments may be combined into one entity, which may perform functions identical to those of the relevant components before the combination. FIG. **20** illustrates a block diagram of a program module according to various embodiments. According to an embodiment, the program module **2010** (for example, the program **140**) may include an Operating System (OS) that controls resources relating to an electronic device (for example, the electronic device **101**) and/or various applications (for example, the application programs **147**) that are executed in the operating system. The operating system may be, for example, Android, iOS, Windows, Symbian, Tizen, Bada, and the like

The program module **2010** may include a kernel **2020**, middleware **2030**, an Application Programming Interface (API) **2060**, and/or applications **2070**. At least a part of the program module **2010** may be preloaded on the electronic device, or may be downloaded from an external electronic device (for example, the electronic device **102** or **104** or the server **106**).

The kernel **2020** (for example, the kernel **141** of FIG. **1** or the kernel **1511***e* of FIG. **15**) may include, for example, a system resource manager **2021** and/or a device driver **2023**. The system resource manager **2021** may control, allocate, or retrieve system resources. According to an embodiment, the system resource manager **2021** may include a process manager, a memory manager, or a file system manager. The device driver **2023** may include, for example, a display driver, a camera driver, a Bluetooth™ driver, a shared memory driver, a USB driver, a keypad driver, a Wi-Fi driver, an audio driver, or an Inter-Process Communication (IPC) driver.

The middleware **2030** may provide a function used by the applications **2070** in common or provide various functions to the applications **2070** through the API **2060** so that the applications **2070** can efficiently use limited system resources within the electronic device. According to an embodiment, the middleware **2030** (for example, the middleware **143**) may include, for example, at least one of a runtime library **2035**, an application manager **2041**, a window manager **2042**, a multimedia manager **2043**, a resource manager **2044**, a power manager **2045**, a database manager **2046**, a package manager **2047**, a connectivity manager **2048**, a notification manager **2049**, a location manager **2050**, a graphic manager **2051**, and a security manager **2052**.

The runtime library **2035** may include, for example, a library module that a compiler uses in order to add a new function through a programming language while the applications **2070** are being executed. The runtime library **2035** may perform input/output management, memory management, the functionality for an arithmetic function, and the like.

The application manager **2041** may manage, for example, the life cycle of at least one of the applications **2070**. The window manager **2042** may manage Graphical User Interface (GUI) resources used on a screen. The multimedia manager **2043** may determine formats used to reproduce various media files and may encode or decode a media file using a coder/decoder (codec) appropriate for the corresponding format. The resource manager **2044** may manage resources, such as the source code, the memory, the storage space, and the like of at least one of the applications **2070**.

The power manager **2045** may operate together with a Basic Input/Output System (BIOS) to manage a battery or power and may provide power information used for the operation of the electronic device. The database manager **2046** may generate, search for, and/or change a database to be used by at least one of the applications **2070**. The package manager **2047** may manage the installation or update of an application that is distributed in the form of a package file.

The connectivity manager **2048** may manage a wireless connection, such as Wi-Fi, Bluetooth™, and the like. The notification manager **2049** may display or notify of an event, such as an arrival message, an appointment, a proximity notification, and the like, in such a manner that a user is not disturbed. The location manager **2050** may manage the location information of the electronic device. The graphic manager **2051** may manage a graphic effect to be provided to a user and a user interface relating to the graphic effect. The security manager **2052** may provide various security functions used for system security, user authentication, and the like. According to an embodiment, in a case where the electronic device (for example, the electronic device **101**) has a telephone call function, the middleware **2030** may further include a telephony manager for managing a voice or video call function of the electronic device.

The middleware **2030** may include a middleware module that forms a combination of various functions of the above-described elements. The middleware **2030** may provide specialized modules according to the types of operating systems in order to provide differentiated functions. Furthermore, the middleware **2030** may dynamically remove some of the existing elements, or may add new elements.

The API **2060** (for example, the API **145**) is, for example, a set of API programming functions, and may be provided with different configurations according to operating systems. For example, in the case of Android or iOS, one API set may be provided for each platform, and in the case of Tizen, two or more API sets may be provided for each platform.

The applications **2070** (for example, the application programs **147**) may include one or more applications that can perform functions, for example, home **2071**, dialer **2072**, SMS/MMS **2073**, Instant Message (IM) **2074**, browser **2075**, camera **2076**, alarm **2077**, contacts **2078**, voice dial **2079**, e-mail **2080**, calendar **2081**, media player **2082**, album **2083**, clock **2084**, health care (for example, measuring exercise quantity or blood sugar), and environment information (for example, atmospheric pressure, humidity, temperature information, and the like).

According to an embodiment, the applications **2070** may include an application (hereinafter, referred to as an "information exchange application" for convenience of description) that supports information exchange between the electronic device (for example, the electronic device **101**) and an external electronic device (for example, the electronic device **102** or **104**). The information exchange application may include, for example, a notification relay application for transferring specific information to an external electronic device or a device management application for managing an external electronic device.

For example, the notification relay application may include a function of delivering, to the external electronic device (for example, the electronic device **102** or **104**), notification information generated by other applications (for example, an SMS/MMS application, an email application, a health care application, an environmental information application, and the like) of the electronic device. Furthermore, the notification relay application may, for example, receive notification information from the external electronic device and may provide the received notification information to a user.

The device management application may manage (for example, install, delete, or update), for example, at least one function of an external electronic device (for example, the electronic device **102** or **104**) that communicates with the electronic device (for example, a function of turning on/off the external electronic device itself (or some components thereof) or a function of adjusting the brightness (or resolution) of a display), applications that operate in the external electronic device, or services (for example, a call service, a message service, and the like) that are provided by the external electronic device.

According to an embodiment, the applications **2070** may include applications (for example, a health care application of a mobile medical appliance, and the like) that are specified according to attributes of an external electronic device (for example, the electronic device **102** or **104**). According to an embodiment, the applications **2070** may include applications that are received from an external electronic device (for example, the server **106**, or the electronic device **102** or **104**). According to an embodiment, the applications **2070** may include preloaded applications or third-party applications that can be downloaded from a server. Names of the elements of the program module **2010**, according to the above-described embodiments of the present disclosure, may change depending on the type of OS.

According to various embodiments of the present disclosure, at least some of the program module **2010** may be implemented in software, firmware, hardware, or a combination of two or more thereof. At least some of the program module **2010** may be implemented (for example, executed) by, for example, the processor (for example, the processor **1910**). At least some of the program module **2010** may include, for example, a module, a program, a routine, a set of instructions, and/or a process for performing one or more functions.

The term "module" as used herein may, for example, mean a unit including one of hardware, software, and firmware or a combination of two or more of them. The "module" may be interchangeably used with, for example, the term "unit", "logic", "logical block", "component", or "circuit". The "module" may be a minimum unit of an integrated component element or a part thereof. The "module" may be a minimum unit for performing one or more functions or a part thereof. The "module" may be mechanically or electronically implemented. For example, the "module" according to the present disclosure may include at least one of an Application-Specific Integrated Circuit (ASIC) chip, a Field-Programmable Gate Arrays (FPGA), and a

programmable-logic device for performing operations which has been known or are to be developed hereinafter.

According to various embodiments, at least some of the devices (for example, modules or functions thereof) or the method (for example, operations) according to the present disclosure may be implemented by a command stored in a computer-readable storage medium in a programming module form. The instruction, when executed by a processor (e.g., the processor **120**), may cause the one or more processors to execute the function corresponding to the instruction. The computer-readable storage medium may be, for example, the memory **130**.

The computer readable recoding medium may include a hard disk, a floppy disk, magnetic media (e.g., a magnetic tape), optical media (e.g., a Compact Disc Read Only Memory (CD-ROM) and a Digital Versatile Disc (DVD)), magneto-optical media (e.g., a floptical disk), a hardware device (e.g., a Read Only Memory (ROM), a Random Access Memory (RAM), a flash memory), and the like. In addition, the program instructions may include high class language codes, which can be executed in a computer by using an interpreter, as well as machine codes made by a compiler. The aforementioned hardware device may be configured to operate as one or more software modules in order to perform the operation of the present disclosure, and vice versa.

The programming module according to the present disclosure may include one or more of the aforementioned components or may further include other additional components, or some of the aforementioned components may be omitted. Operations executed by a module, a programming module, or other component elements according to various embodiments of the present disclosure may be executed sequentially, in parallel, repeatedly, or in a heuristic manner. Further, some operations may be executed according to another order or may be omitted, or other operations may be added. According to various embodiments, a computer-readable recording medium having a program recorded therein to be executed on a computer is provided. The program may include instructions that, when executed by a processor, cause the processor to perform an operation of, when a cover is connected to the electronic device, an operation of determining generation of an event related to the cover; an operation of, when the event is generated, supplying power to the cover through wireless communication; an operation of, when the cover is driven by the supplied power, an operation of transmitting event information to the cover through the short range wireless communication to display the information related to the generated event on the cover; and an operation of, when an operation of the cover according to the event is completed, switching to a standby mode after releasing a short range wireless communication connection with the cover.

Although the present disclosure has been described with an exemplary embodiment, various changes and modifications may be suggested to one skilled in the art. It is intended that the present disclosure encompass such changes and modifications as fall within the scope of the appended claims.

What is claimed is:

1. An electronic device comprising:

a wireless communication circuit; and

at least one processor, wherein the at least one processor is configured to:

identify that a first external electronic device is connected to the electronic device, while wireless power for charging the electronic device is transmitted from a second external electronic device,

identify whether an event related to the first external electronic device occurs,

based on identifying that the event related to the first external electronic device occurs, control to supply power to the first external electronic device, and

transmit, to the first external electronic device, information associated with the event for display by using the wireless communication circuit, while the power is supplied to the first external electronic device and the wireless power for charging the electronic device is transmitted from the second external electronic device.

2. The electronic device of claim **1**, wherein the at least one processor is further configured to:

generate information according to a received phone call or a received message; and

identify that the event related to the first external electronic device occurs based on the generated information.

3. The electronic device of claim **1**, wherein the at least one processor is further configured to:

detect an execution of an application for operating the first external electronic device; and

identify that the event related to the first external electronic device occurs based on the detected execution of the application.

4. The electronic device of claim **1**, further comprising a connector, and

wherein the at least one processor is further configured to:

identify the first external electronic device that is connected to the electronic device based on a predefined parameter; and

determine that the event related to the first external electronic device occurs in response to identifying the first external electronic device.

5. The electronic device of claim **1**, wherein the information associated with the event is configured to be displayed on a display of the first external electronic device.

6. The electronic device of claim **1**, further comprising:

a first antenna for receiving the wireless power for charging a battery of the electronic device from the second external electronic device; and

a second antenna for wirelessly communicating with the first external electronic device.

7. The electronic device of claim **1**, wherein the at least one processor is configured to:

identify whether the first external electronic device is driven according to the supplied power, and

based on identifying that the first external electronic device is driven, transmit, to the first external electronic device, the information associated with the event by using the wireless communication circuit.

8. The electronic device of claim **1**, wherein the at least one processor is further configured to control to supply the power for a preset time period after transmitting the information associated with the event to the first external electronic device.

9. The electronic device of claim **1**, further comprising a display positioned on a front surface of the electronic device,

wherein a first part of the first external electronic device is configured to cover the display of the electronic device when the first external electronic device is in a closed state and expose the display of the electronic device when the first external electronic device is in an

open state and a second part of the first external electronic device is configured to cover a back surface of the electronic device,

wherein an inner surface of the first part is configured to face the display of the electronic device,

wherein a display of the first external electronic device is positioned on an outer surface of the first part, and

wherein the second part includes a wireless communication circuit configured to communicate with the wireless communication circuit of the electronic device.

10. An electronic device comprising:

a wireless communication circuit; and

at least one processor, wherein the at least one processor is configured to:

identify that a first external electronic device is connected to the electronic device while wireless power for charging the electronic device is transmitted from a second external electronic device,

identify whether an event for executing an application occurs,

based on identifying that the event for executing the application occurs on the electronic device, control to supply power to the first external electronic device, and

transmit information associated with the event for display by using the wireless communication circuit while the power is supplied to the first external electronic device and the wireless power for charging the electronic device is transmitted from the second external electronic device.

11. The electronic device of claim **10**, wherein the information associated with the event is configured to be displayed on a display of the first external electronic device.

12. The electronic device of claim **10**, further comprising:

a first antenna for receiving the wireless power for charging a battery of the electronic device from the second external electronic device; and

a second antenna for wirelessly communicating with the first external electronic device.

13. The electronic device of claim **10**, wherein the at least one processor is further configured to control to supply the power for a preset time period after transmitting the information associated with the event.

14. The electronic device of claim **10**, wherein the at least one processor is further configured to:

based on identifying that the first external electronic device is connected to the electronic device, establish a communication connection with the first external electronic device by using the wireless communication circuit.

15. The electronic device of claim **10**, further comprising a display positioned on a front surface of the electronic device,

wherein a first part of the first external electronic device is configured to cover the display of the electronic device when the first external electronic device is in a closed state and expose the display of the electronic device when the first external electronic device is in an open state and a second part of the first external electronic device is configured to cover a back surface of the electronic device,

wherein an inner surface of the first part is configured to face the display of the electronic device,

wherein a display of the first external electronic device is positioned on an outer surface of the first part, and

wherein the second part includes a wireless communication circuit configured to communicate with the wireless communication circuit of the electronic device.

16. The electronic device of claim **10**, wherein the at least one processor is further configured to control to supply the power to the first external electronic device for a predetermined time after the event occurs.

17. The electronic device of claim **10**, wherein the wireless communication circuit is configured to communicate with the first external electronic device that is connected to the electronic device through short range wireless communication.

18. The electronic device of claim **10**, wherein the at least one processor is further configured to:

receive a tag from the first external electronic device, and

based on receiving the tag, release connection with the first external electronic device.

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